



KINGS COUNTY WATER DISTRICT GROUNDWATER MANAGEMENT PLAN

**DATE OF ENACTMENT:
JANUARY, 1993**

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PREPARED IN COOPERATION WITH



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I. INTRODUCTION

A. General

The State legislature enacted AB 255, (Costa), regarding Groundwater Management Programs, during the 1991 session. The Act was codified as Part 2.75, commencing with Section 10750 of Division 6 of the Water Code and became effective January 1, 1992.

The Act applies to local agencies whose jurisdiction includes groundwater basins subject to "a critical condition of groundwater overdraft" and covers the Kings Basin, Kaweah Basin and Tulare Lake Basin, all of which the lands of the Kings County Water District (District) are a part (Figure 1).

The Act provides that any district or other political subdivision of the State which is authorized to provide water service and is exercising that authority, may by ordinance or resolution adopt a program for the management of groundwater resources within the area in which water service is being provided in accordance with prescribed procedures.

The Act also authorizes a district to exercise specified powers of a water replenishment district subject to approval of the voters of the district. Realizing the importance of this action and its applicability to the underlying purpose of the District, the District initiated and adopted on December 15, 1992 the current groundwater management plan. More recently the State legislature passed similar legislation permitting districts in areas not subject to critical overdraft to practice groundwater management activities. This legislation known as AB 3030 was signed into law on January 1, 1993.

This report will review and revise specific activities identified in the District's 1992 groundwater management plan and be structured around the 1993 legislation to more closely relate to plans being prepared by other adjacent districts.

B. Purpose and Goal

The formation of the District was brought about because of the potential to export groundwater resources outside the area. During the ensuing years, the District has endeavored to practice sound water management practices by obtaining surface water rights as well as other practices with the intent of preserving the groundwater resources. As such, the District has been practicing groundwater management activities since its formation.

The purpose of this report is to document existing activities and formalize a management program. This program will consist of several elements and have the ability to direct staff with implementation priorities.

The goal of this Plan is to implement effective groundwater management that restores, where possible, and maintain a high quality and dependable groundwater resource.

Upon adoption of this Plan, actions on specific elements will be initiated within the management program to achieve the stated goal. As specific elements take effect, and/or other concerns arise, the management program may be revised to assure continued progress toward the management goal.

C. Powers of the District

The District, in addition to those powers enumerated in AB 3030 (codified at Water Code §§ 10750-10756), exercises all of the powers available to a county water district under the County Water District Law (the "Act"), set out at Water Code §§ 30000-33901.

The District enjoys the uncommon distinction of having successfully litigated the scope of its powers before the California Supreme Court. The general purposes for which the District was formed were clearly stated by the Supreme Court, as follows:

The Kings County Water District was organized February 24, 1954, under the County Water District Law. It comprises approximately 150,000 acres. It was organized primarily to protect the underground water supplies of the area from excessive pumping and to guard against the transportation of the groundwater to areas outside the District. Its purposes and functioning generally have been in accordance with the aims and methods approved by law for such an organization. [...] The protection, conservation and replenishment of the underground water supplies is one of the main functions of the water district in question. Atchison, Topeka & Santa Fe Railway Co. v. Kings County Water District (1956) 47 Cal 2d 140, 143, 146 (citations omitted).

The District has all powers expressly granted or necessarily implied by the Act. Water Code § 31000. The District also has the power generally to perform all acts necessary to carry out fully the provisions of the Act. Water Code § 31001.

Among the District's specific powers are the following:

1. The District may do any act necessary to furnish sufficient water in the district for any present or future beneficial use. Water Code § 31020. For example, the District may, for the purpose of replenishing groundwater:

- (a) Buy and sell water (Water Code §§ 31021, 31042);
- (b) Distribute water to persons in exchange for ceasing or reducing groundwater extractions (Water Code §§ 31022-31023, 31047);
- (c) Spread, sink, and inject water in the underground (Water Code §§ 31021, 31047); and,

(d) Store, transport, capture, reclaim, purify, treat or otherwise manage and control water for the beneficial use of persons or property within the District and build the necessary works to achieve ground water replenishment (Water Code §§ 31021-31022, 31047).

2. The District may take action needed to protect or prevent interference with water, water quality, or water rights within the District. Water Code § 31080, 31081, 31082.

3. The District may take any action necessary to put water under its control to beneficial use. Water Code § 31020-31021, 31080-31082.

4. The District may take any action needed for and to preserve the water within the District for beneficial uses, to prevent contaminants from entering District groundwater supplies, removing contaminants within the District, identifying parties responsible for contamination of groundwater, and performing studies relative to water quality. Water Code § 31082.

5. The District may commence, maintain, intervene in, defend, and compromise actions and proceedings to prevent interference with or diminution of the natural flow of any stream or natural subterranean supply of waters which may (a) be used or be useful for any purpose of the district, (b) be of common benefit to the land or its inhabitants and (c) endanger the inhabitants or land. Water Code § 31082.

6. The District may commence, maintain, intervene in, compromise, and assume the costs of any action or proceeding involving or affecting the ownership or use of waters or water rights with the district used or useful for any purpose of the district or a benefit to any land, including actions to recover the cost of expenditures for groundwater quality protection from parties responsible for the contamination. Water Code § 31081.

7. The District has powers to:

(a) Acquire and operate facilities, water and water rights needed to replenish groundwater supplies (Water Code §§ 31020-31022, 31033, 31040-31042, 31047);

(b) Store water in groundwater basins, acquire water rights, import water into the District, and conserve water (Water Code 31020-31022, 31040-31042, 31047);

(c) Participate in legal proceedings as required to defend water rights, and water supplies and to prevent unlawful exportation of water from the District (Water Code § 31081-31082);¹

(d) To exercise the right of eminent domain (Water Code §§ 31001, 31040, 31081-31082).

(e) Act jointly with other entities to perform its activities (Water Code § 31048, 31049, 31150-31153);

(f) Carry out investigations required to implement the Plan (Water Code § 3100-31001, 31011); and

(g) Fix rates for water replenishment purposes (Water Code §§ 31021-31022, 31024-31025).

8. The District may investigate and consider the use of existing facilities of other agencies to carry out the District's Groundwater Management Program, and if economically feasible and in the best interest of the District, an attempt shall be made to enter into a contract with the agency for use of their facility. See, Water Code §§ 31048-31049, 31150-31153.

The District may fix and collect fees for the extraction of groundwater to pay the expenses and costs associated with the acquisition of replenishment water. Water Code §§ 31024, 31025, 31031, 31032.1, 10754, 10754.2. The District may also levy a water replenishment assessment. Water Code § 10760. However, before any fees may be levied and collected for an assessment imposed under AB 3030, a majority of the voters in the District must ratify the fees. Water Code § 10754.3. The election rules of Kings County Water District would apply for said election.

Additionally, under AB 3030 the District may exercise those powers of a water replenishment district that are set out in Part 4 of Division 18 of the Water Code, §§ 60220-60232. See Water Code § 10754. The relevant powers of a water replenishment district largely parallel the powers of a county water district with respect to groundwater management.

1. The District may do any act necessary to replenish the groundwater of the District. Water Code §§ 60220, 60221. For example, the District may, for the purpose of replenishing groundwater:

¹See also Atchison, *supra*, 47 Cal.2d at 143.

- (a) By and sell water;
 - (b) Distribute water to persons in exchange for ceasing or reducing groundwater extractions;
 - (c) Spread, sink, and inject water in the underground; and,
 - (d) Store, transport, capture, reclaim, purify, treat or otherwise manage and control water for the beneficial use of persons or property within the District and build the necessary works to achieve ground water replenishment.
2. The District may take action needed to protect or prevent interference with water, water quality, or water rights within the District. Water Code § 60223.
3. The District may take any action necessary to put water under its control to beneficial use. Water Code § 60223.
4. The District may take any action needed for and to preserve the water within the District for beneficial uses and based on water quality goals to prevent contaminants from entering District groundwater supplies, removing contaminants within the District, identifying parties responsible for contamination of groundwater, and performing studies relative to the listed water quality goals. Water Code § 60224.
5. The District may take any action needed outside of the District if these actions are required to protect the District's groundwater supplies, and there is a relationship between the groundwater where the action is taken and the District's groundwater. Water Code § 60225.
6. The District may sue to recover the amount of District expenditures for groundwater quality protection parties responsible for the contamination. Water Code § 60226.
7. The District holds the additional powers of a water replenishment district, pursuant to Water Code § 60230, to:
- (a) Acquire and operate facilities, water rights needed to replenish the groundwater supplies;
 - (b) Store water in groundwater basins, acquire water rights, import water into the District, and

conserve water;

(c) Participate in legal proceedings as required to defend water rights, and water supplies and to prevent unlawful exportation of water from the District;

(d) Under certain conditions, to exercise the right of eminent domain.

(e) Act jointly with other entities in order to perform required activities;

(f) Carry out investigations required to implement the program;

(g) Fix rates for water replenishment purposes; and,

(h) Fix the terms and conditions for contracts for use of surface water in lieu of groundwater.

8. The District must investigate and consider the use of existing facilities of other agencies to carry out the Plan if such other agency has available facilities adequate for the purposes of the District, and if economically feasible and in the best interest of the District, an attempt shall be made to enter into a contract with the agency for use of their facility. Water Code § 60231.

II. DESCRIPTION OF DISTRICT

A. Description of District Area

1) Location

The Kings County Water District was formed in 1954 under the County Water District Act to provide a legal entity for water management in the northeast portion of Kings County (Figure 2).

The District encompasses a land area of approximately 143,000 acres. The District includes portions of the service areas of three major mutual ditch companies: Peoples Ditch Company and Last Chance Water Ditch Company, which possess water rights on the Kings River, and the Lakeside Ditch Company, which holds water rights on the Kaweah River. In addition to the service areas of these ditch companies, the District boundary completely encompasses the area (31,845 acres) of the Lakeside Irrigation Water District, a California Water District formed to administer the water rights and distribution system of the Lakeside Ditch Company within the Lakeside Irrigation Water District. The District also includes an improvement district which was formed under the auspices of the Kings County Water District for the maintenance and operation of the Riverside Ditch, a conveyance system used to distribute a portion of the Peoples Ditch Company water.

These three major ditch companies were formed as mutual companies in the early 1870's, when this portion of the San Joaquin Valley was the focus of settlement. These private appropriations and diversions were among the earliest major irrigation projects in the San Joaquin Valley (Figure 2).

In addition to the ditch companies, the District also overlaps the Consolidated and Alta Irrigation Districts and the Kaweah Delta Water Conservation District.

Figure 3 depicts the boundaries of the various districts described above.

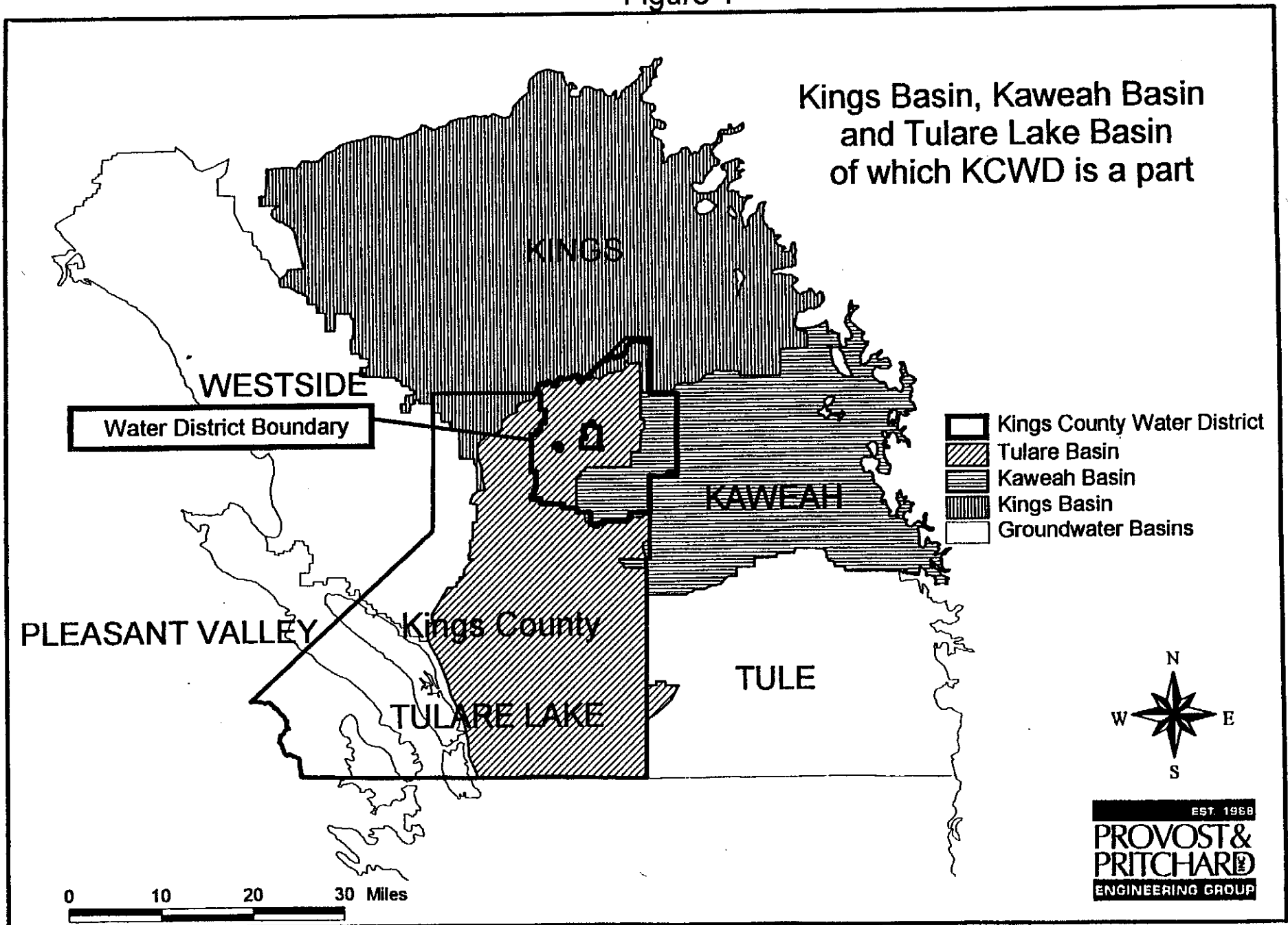
2) Topography

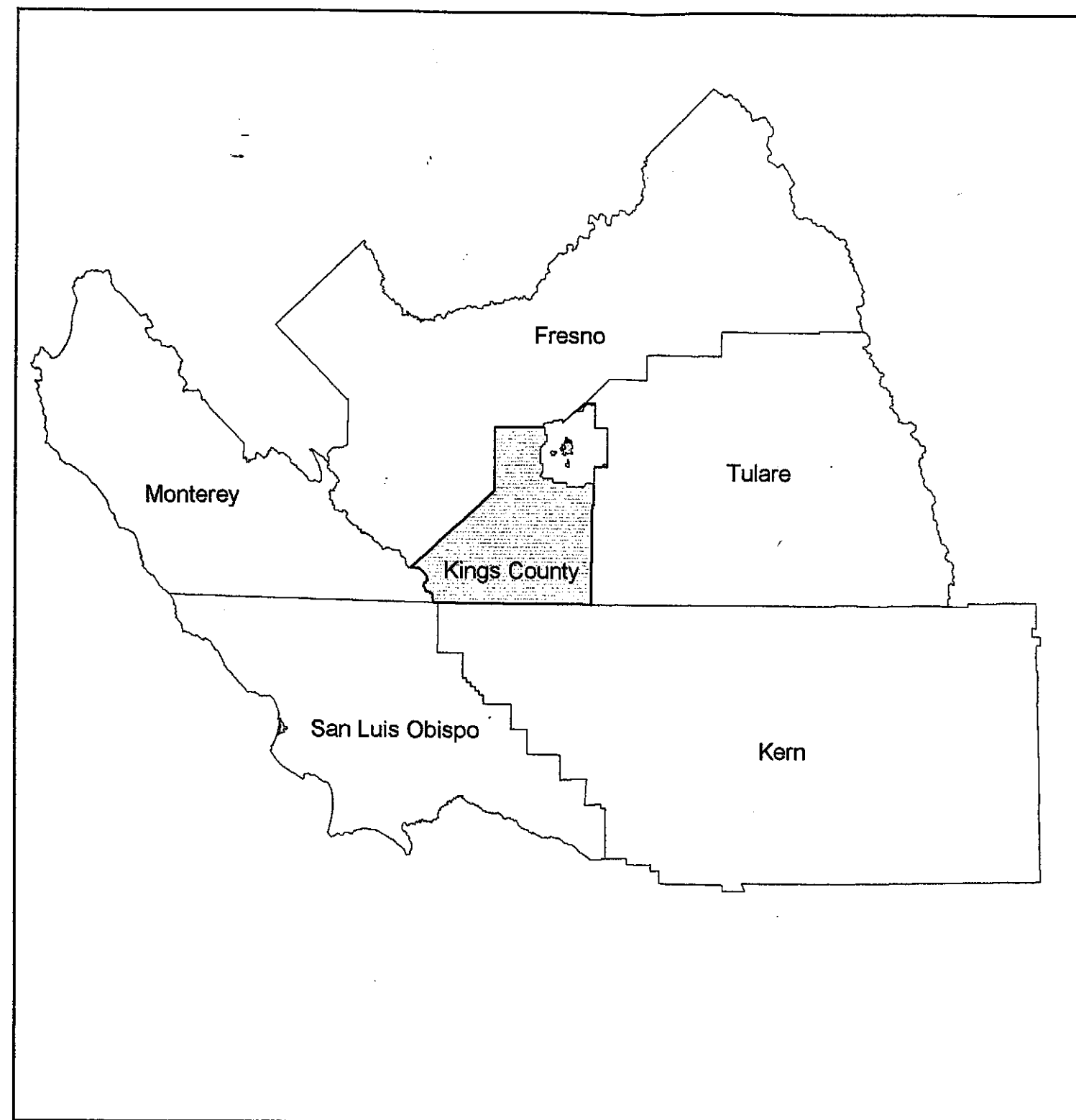
Land in the District generally slopes downward from the northeast to southwest at three to four feet per mile, with local variations caused by remnants of slough channels. Elevations range from 220 to 300 feet above sea level.

3) Climate

The climate of the District is characterized by cool, mild winters and hot, dry summers. Temperatures in the summer often exceed 100 degrees

Figure 1





Regional Map



KINGS COUNTY WATER DISTRICT

Legend

-  KCWD Excluded
-  Kings County Water District

GROUNDWATER MANAGEMENT PLAN

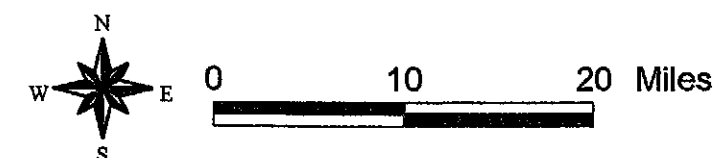


Figure 2

Geographic Boundaries of Agencies



KINGS COUNTY WATER DISTRICT

Legend

- State Highways
- Kings County Water District Boundary
- Alta Irrigation District
- Consolidated Irrigation District
- Lakeside Irrigation District Boundary
- Kaweah Delta Conservation District

GROUNDWATER MANAGEMENT PLAN

Consolidated Irrigation District

Alta Irrigation District

Kings County Water District

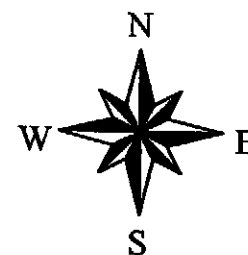
Lakeside Irrigation Water District

Kaweah Delta Conservation District

HIGHWAY 41

HIGHWAY 198

HIGHWAY 43



0 8 16 Miles

Figure 3

Fahrenheit. Fog is experienced for long periods in the winter, with temperatures typically in the mid-30's. Winter temperatures occasionally drop into the 20's. Average annual precipitation is about 8.5 inches, with 80 percent of the rainfall occurring in the winter months. The frost-free growing season averages around 250 days per year.

B. Water Supply

1) Surface Water Quantity

The surface water supply of the District comes from various sources. A major portion is obtained from the Kings River through ownership of shares of stock in the Peoples Ditch Company and the Last Chance Water Ditch Company, and from the Kaweah River through ownership of shares of Lakeside Ditch Company stock. When the area's mutual water companies were first formed, the corporate stock was held in private ownership and the water was distributed to shareholders on an acreage basis to provide the landowner/shareholder with an assured surface water supply. However, the stock is transferable to anyone, even parties outside of the ditch companies historic service area. Prior to the formation of the District in 1954, a major portion of the stock of these ditch companies had been sold by the private owners to parties outside of the present District, creating an imbalance in the overall water supply of the area that manifested into a serious groundwater overdraft. The recognition of this situation was a major reason for the formation of the Kings County Water District.

The Kings County Water District has, since its formation, attempted to purchase all available water stock of these ditch companies to assist in preserving the water rights of the area.

In addition to the surface water distributed in the District from ditch companies, the District has purchased surplus surface water from the Central Valley Project made available through Short Term Contracts with the U.S. Bureau of Reclamation. The last Short Term Contract expired in October 1983; however, temporary contracts have been executed annually every year thereafter that CVP water has been available. The temporary CVP contracts have resulted in the delivery of San Joaquin River water into the basin.

The District has also endeavored to divert and recharge the basin with as much flood released water as is made available from the San Joaquin, Kings, and Kaweah Rivers. All of the imported supplies have either recharged the underground from the sinking basins or been diverted for direct surface irrigation within the District. Kings River water that is diverted is usually taken in high flows for short durations. The substitution of imported surface water supplies in place of groundwater extractions by the farmers is the key element in the District's conjunctive use program. Integrating the somewhat

uncertain surface water supplies of the District with groundwater pumping by individual farmers has resulted in an effective means of satisfying irrigation demands and the preservation of groundwater.

Table 1 shows the surface water supplies available to the District.

2) Surface Water Quality

Kings River water is of excellent quality for irrigation. Salt content, measured as total dissolved solids (TDS), typically runs around 50 parts per million (ppm) and boron content is generally less than 0.1 ppm. Infiltration problems sometimes occur due to the purity of the water.

3) Groundwater Quantity

The groundwater beneath the Kings County Water District (which is extremely good quality for irrigation) is the only firm water supply available within the District. Agriculture, municipalities, and industry all regularly draw upon this valuable resource from individual wells, as surface water supplies are available only on an intermittent basis.

Conjunctive use of surface water and groundwater has been practiced within the District since its formation in 1954. Through the purchase of slough channels and other appropriate sites for use as recharge basins, and by the purchase and importation of available surplus water and flood released water, the Kings County Water District has reduced the decline of groundwater levels within the District.

The Kings County Water District has, since 1963, engaged in a cooperative program with the State Department of Water Resources for the monitoring and sampling of groundwater in the District. Water level measurements are annually obtained from approximately 200 wells in both the spring and fall. The data obtained in the spring (normally the last of January) reflects the "seasonal high" water table, as the measurements are made prior to pumping for pre-irrigation. The fall measurements (normally obtained in the first part of October) are taken after a full season of crop irrigation pumping.

Fall groundwater maps for 1940, 1950, 1960, 1970, 1977, 1980, 1990, and 2000, show the change in levels for successive ten year periods. The fall 1977 groundwater map has been included to reflect the conditions that prevailed following the two consecutive extremely dry years of 1976 and 1977 which resulted in all-time low groundwater levels within the District. Included as Figures 4, 5 and 6 are reproductions of the maps for 1940, 1977, and 2000, respectively. Table 2 provides a summary of depth to unconfined static groundwater for all years that measurements were made within the District. The average depth is computed from the elevations established from the lines of equal elevation of water in wells.

Table 1											
Surface Water Supplies within Kings County Water District											
Year	Peoples Ditch Co.(AF)	Last Chance Water Ditch Co. (AF)	Lakeside I.W.D.(AF)	Kings Flood Water (AF)	Kaweah Flood Water (AF)	CVP Water (AF)	Consolidated I.D.(AF)	Alta I.D. (AF)	City Effluent (AF)	Loss Water (AF)	Total (AF)
2000	37,328	41,252	18,812	1,297	20,804	12,994			1,951	11,647	146,085
1999											
1998											
1997											
1996											
1995											

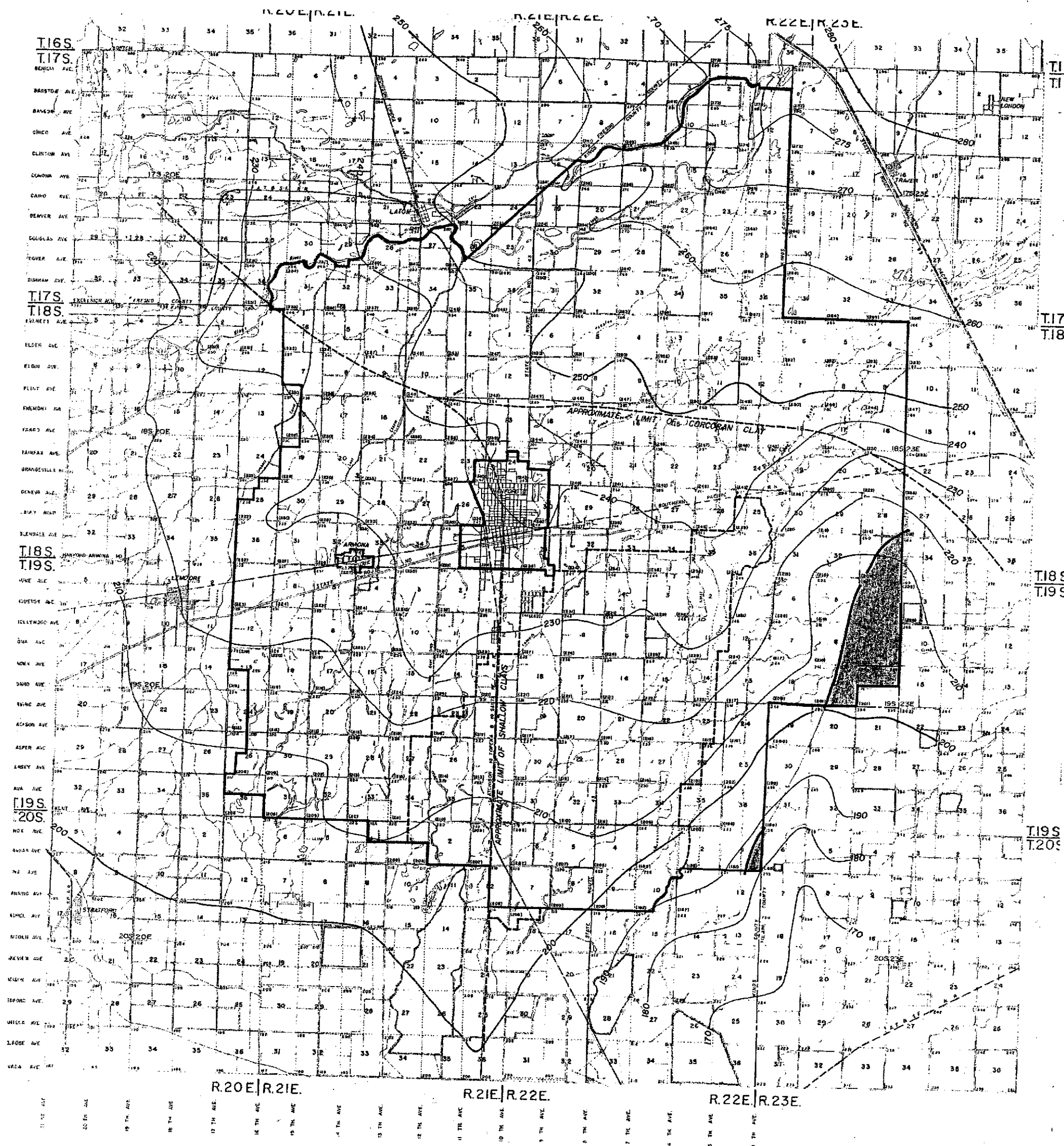


Figure 4

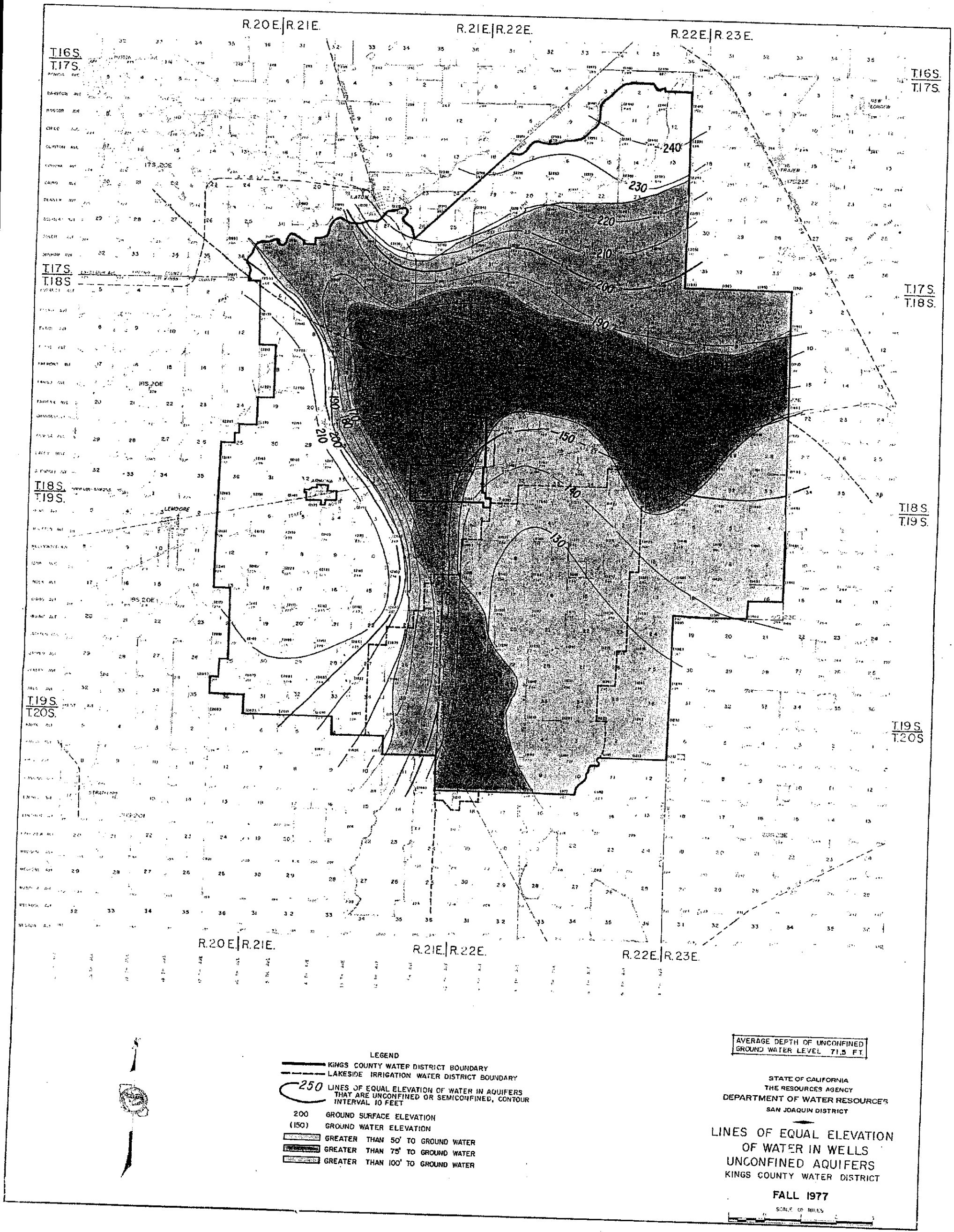


Figure 5

ELEVATION OF WATER IN WELLS FALL 2000 (FOREBAY AND LOWER UNCONFINED AQUIFER)



KINGS COUNTY WATER DISTRICT

AVERAGE DEPTH TO
WATER IN WELLS: 89.8 FT

LEGEND

- KINGS COUNTY WATER DISTRICT BOUNDARY
- STATE HIGHWAYS
- MAIN ROADS
- STANDARD ROADS
- SECTION LINES
- RAILROAD TRACKS
- LINES OF EQUAL ELEVATION
- DEPTH TO GROUNDWATER GREATER THAN 50 FEET
- DEPTH TO GROUNDWATER GREATER THAN 75 FEET
- DEPTH TO GROUNDWATER GREATER THAN 100 FEET
- DEPTH TO GROUNDWATER GREATER THAN 125 FEET
- DEPTH TO GROUNDWATER GREATER THAN 150 FEET

GROUNDWATER MANAGEMENT PLAN

FIGURE 6

EST. 1960
PROVOST & PRITCHARD
ENGINEERING GROUP
266 WEST CROMWELL AVENUE
FRESNO, CALIFORNIA 93711-6182
559/449-2700 FAX 559/449-2715

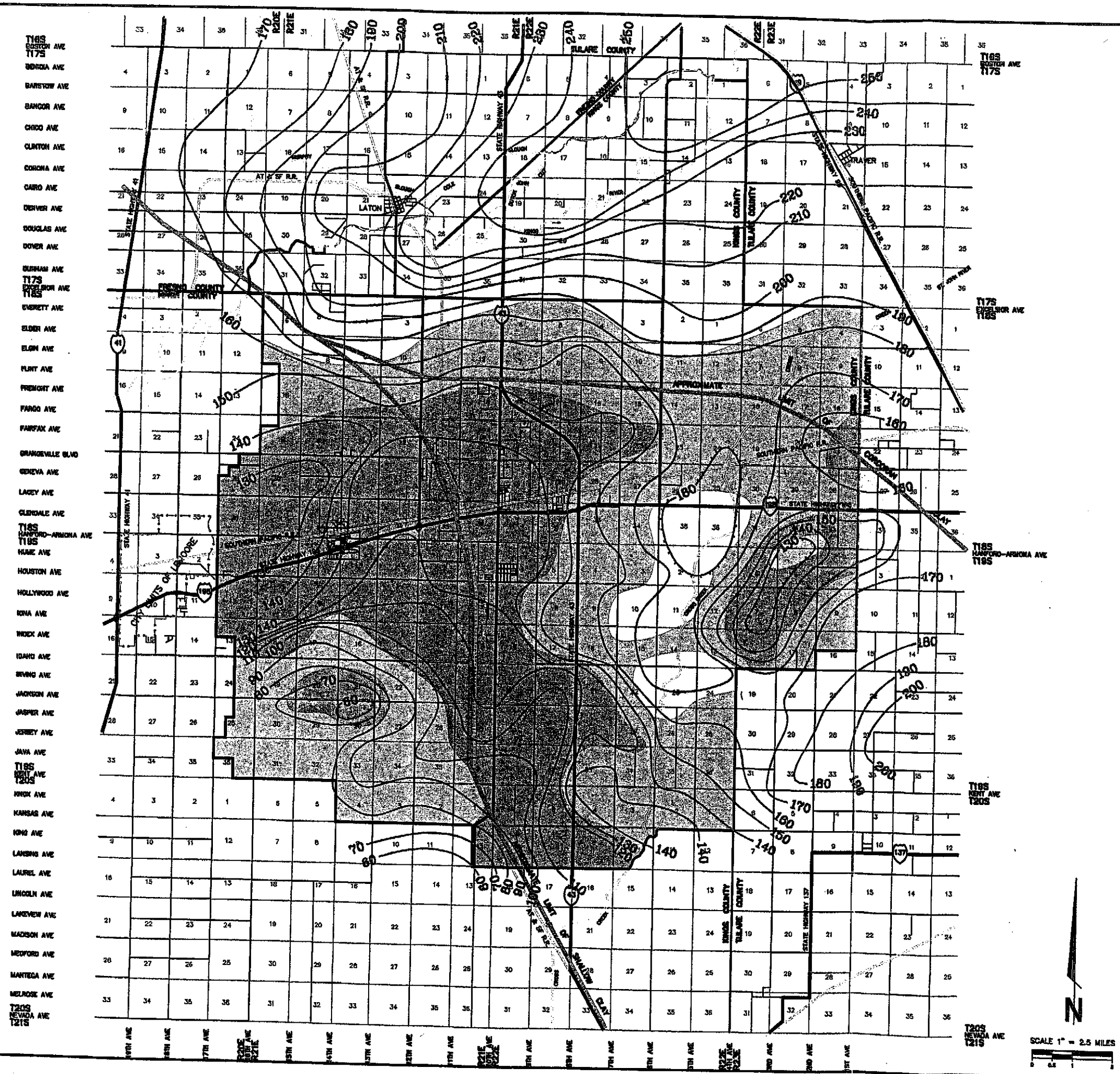


Table 2

**KINGS COUNTY WATER DISTRICT
SUMMARY OF DEPTH TO UNCONFINED GROUNDWATER**

Year	SPRING					FALL				
	Deepest	Shallowest	Combined Aquifers	Average		Deepest	Shallowest	Combined Aquifers	Average	
				Upper Unconfined Aquifer	Lower Unconfined Aquifer				Upper Unconfined Aquifer	Lower Unconfined Aquifer
1940	-	-	-			56	0	15		
1950	-	-	-			77	12	30		
1956	93	5	32			-	-	-		
1957	84	4	29			-	-	-		
1958	88	4	34			-	-	-		
1959	80	2	30			-	-	-		
1960	89	6	38			110	13	47		
1961	104	3	46			-	-	-		
1962	116	3	51			-	-	-		
1963	112	5	48			-	-	-		
1964	107	9	47			131	11	58		
1965	102	5	50			135	8	61		
1966	99	6	51			137	10	65		
1967	101	8	54			115	5	56		
1968	97	3	47			131	5	55		
1969	102	3	49			105	2	44		
1970	84	1	41			96	6	47		
1971	94	1	45			104	2	53		
1972	100	4	50			146	3	62		
1973	103	5	54			105	7	56		
1974	94	3	50			96	1	52		
1975	97	3	49			98	5	55		
1976	101	4	52			121	3	65		
1977	106	8	60			117	10	72		
1978	116	6	66			116	6	64		
1979	98	4	56			109	7	61		
1980	99	6	57			102	6	56		
1981	97	2	50			109	7	61		
1982	102	6	56			100	6	57		
1983	88	3	44			87	1	40		
1984	89	1	36			82	1	36		
1985	77	1	36			101	1	42		
1986	77	5	41			86	1	39		
1987	76	2	37			96	4	47		
1988	78	4	39			88	6	48		
1989	82	2	45			104	4	55		
1990	95	4	54			109	7	67		
1991	113	6	65			117	12	72		
1992	123	8	67			189	8	82		
1993	169	9	-			167	8	85	25	109
1994	161	8	-	35	99	186	10	-	29	118
1995	183	8	-	27	107	156	5	-	22	102
1996	136	7	-	25	91	195	5	-	21	100
1997	134	5	-	20	84	183	6	-	18	99
1998	127	5	-	15	83	n/a	n/a	-	n/a	n/a
1999	129	4	-	13	75	155	6	-	18	89
2000	136	6	-	16	80	169	6	-	16	90

NOTE: Data prior to 1993 by others

The static confined groundwater levels within the District as of the fall of 2000 ranged from 55 feet near the Kings River in the north to 164 feet in the southeastern portion of the District.

Current estimates of usable storage is 9 million AF.

4) Groundwater Quality

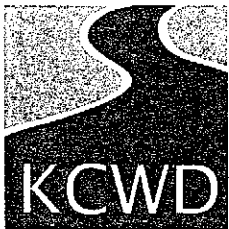
The cooperative program between the State and the District was expanded to include monitoring of groundwater quality which was conducted in years 1970, 1975, 1978, 1987, and 1991. Water samples from selected wells were collected in those years and delivered to the State and private laboratories for analysis. In 1997 the wells were surveyed and measurements of electrical conductivity were made.

C. Land Use

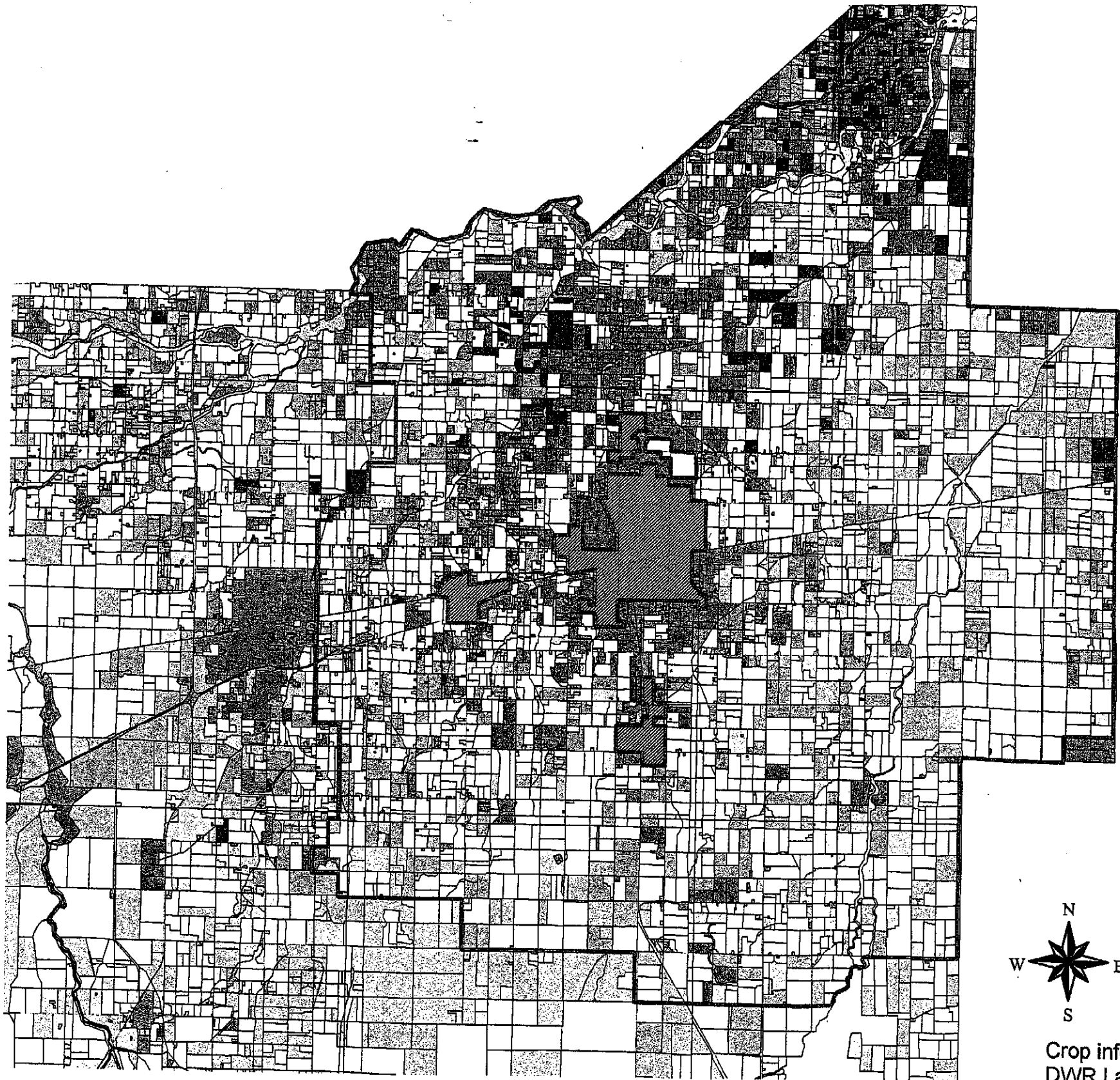
From historical accounts, it appears that as of the 1950's, all of the current acreage of the District was developed, with the exception of 20,000 acres. These same accounts estimated that as of 1970, all the lands within the District would be developed (Figure 7). Recent statistics identified by the 1996 DWR land use survey are as follows:

<u>Crops</u>	<u>Gross Acres</u>
Citrus	421
Deciduous Fruit & Nuts	18,022
Field Crops	78,925
Grain & Hay	4,575
Idle	799
Pasture	16,418
Truck Crops	1,491
Vineyard	3,592
Riparian Veg.	0
Native Veg.	3,407
Water	281
Semi Ag	6,519
Urban	5,629
Other	2
	<hr/>
	140,083

Kings County Water District
1996 Crop Map



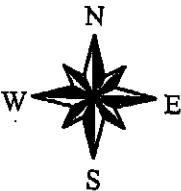
KINGS COUNTY WATER DISTRICT



LEGEND

- Citrus
- Deciduous Fruits and Nuts
- Field Crops
- Grain and Hay
- Idle
- Pasture
- Truck, Nursery and Berry Crops
- Vineyards
- Riparian Vegetation
- Native Vegetation
- Water Surface
- Semiagricultural
- Non Ag
- Not Surveyed
- KCWD Boundary

GROUNDWATER MANAGEMENT PLAN



Crop information from 1996
DWR Land Use Survey



Figure 7

D. Water Demand

The water demand for crops grown within the Kings County Water District is estimated to range from 1.30 acre-feet per acre for grain to 5.00 acre-feet per acre for irrigated pasture, with an average annual use in the District from 2.8 to 3.1 acre-feet per acre, depending on crop patterns and double cropping. The municipal demand within the District has also been approximated by the two municipal suppliers as 1.81 and 0.35 acre-feet per acre for Hanford and Armona, respectively.

A summary of the Water Demand and Supply Inventory for the District had been tabulated for the years 1970 through 1986 and is set forth as Table 3. This is dated information and should be updated. As shown in column 9, the average annual groundwater "draft" was estimated at approximately 126,600 acre-feet for the District.

During the 17-year period (1970-1986) the total water demands within the District versus the total water supply (surface water and groundwater) indicates that the area was near a water balance. Evaluating the sources of the surface supply for the study period reveals that an average yield of about 150,000 acre-feet per year may be anticipated by the District from the ditch company rights under normal hydrologic conditions on the Kings and Kaweah Rivers. The data also revealed that during the same period the Kings County Water District purchased an average surface supply of approximately 30,500 acre-feet per year and the Lakeside Irrigation Water District purchased an additional 15,000 acre-feet per year. It is anticipated that the District will collect the needed information to prepare a water budget and compare the data from the budget with results from well measurements.

E. Water Related Facilities

1) District System Inventory

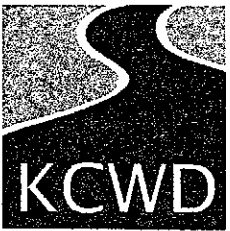
The District owns and operates numerous intentional recharge basins that are located throughout the District. In addition, the District operates the 10 mile Riverside Ditch for direct delivery of surface water for agricultural production and the 10 mile Old River channel for intentional groundwater recharge activities. These are shown on Figure 8.

2) Other Facilities

Other facilities for the conveyance and recharge of surface water are numerous. These consist of the canal delivery system for the Last Chance Water Ditch Company, the Peoples Ditch Company, the Lakeside Water Irrigation District, Kaweah-Delta Water Conservation District, Consolidated

and Alta Irrigation Districts, and several private ditches used for conveyance of water through the District. These facilities are shown in Figure 8.

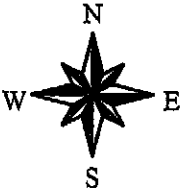
Kings County Water District
Facilities and Distribution System



Legend

- Highway
- Street
- Boswell canal
- Lakeside canal
- Last Chance canal
- Peoples canal
- Riverside canal
- Settlers canal
- KCWD Basins
- Excluded land
- Kings County Water District

GROUNDWATER MANAGEMENT PLAN



0 2.5 5 Miles

Figure 8

Table 3
KINGS COUNTY WATER DISTRICT
WATER DEMAND AND SUPPLY INVENTORY

Water Year	Irrigated Crop Acreage	WATER DEMANDS			SURFACE WATER SUPPLY			Gross Groundwater Pumped (Col.4 - Col.5)	(b) Net Groundwater Draft Within District	(c) Annual Change In Depth to Groundwater	(d) Groundwater Depletion or Replenishment	Groundwater Yield (Col.9 +/- Col.11)	Kings River Runoff
		Irrigated (FDR) (a)	Urban	Total	Farm Deliveries	Percolation & Evaporation Losses	Total						
		Acres (1)	A.F. (2)	A.F. (3)	A.F. (4)	A.F. (5)	A.F. (6)	A.F. (7)	A.F. (8)	Fl. (9)	A.F. (10)	A.F. (11)	M.A.F. (12)
1970	121,000	363,000	6,500	369,500	122,182	97,047	219,229	247,318	104,551	-2.9	-41,470	63,081	1.33
1971	121,500	364,500	6,600	371,100	83,904	61,877	145,781	287,196	175,842	-5.9	-84,370	91,472	1.17
1972	122,500	367,500	6,700	374,200	54,897	43,038	97,935	319,303	224,439	-8.5	-121,550	102,889	0.86
1973	126,000	378,000	6,800	384,800	163,727	107,022	270,749	221,073	67,033	5.8	80,080	147,113	2.13
1974	125,000	375,000	6,900	381,900	145,374	133,579	278,953	236,526	59,020	3.6	51,480	110,500	2.10
1975	127,000	381,000	7,000	388,000	92,737	71,138	163,875	295,263	173,039	-2.8	-40,040	132,999	1.58
1976	127,500	382,500	7,100	389,600	29,047	26,622	55,669	360,553	278,153	-9.4	-134,420	143,733	0.54
1977	128,500	385,500	7,200	392,700	9,714	20,277	29,991	382,986	305,832	-7.0	-100,100	205,732	0.39
1978	126,000	378,000	7,300	385,300	173,174	114,438	287,612	212,126	51,337	7.8	111,540	162,877	3.45
1979	125,500	376,500	7,400	383,900	152,965	98,153	251,118	230,935	85,012	2.5	35,750	120,762	1.73
1980	125,000	375,000	7,500	382,500	161,216	94,733	255,949	221,284	78,649	4.8	68,640	147,289	3.05
1981	127,500	382,500	8,000	390,500	83,767	58,267	140,034	306,733	197,518	-4.3	-61,490	136,028	1.04
1982	126,500	379,500	8,500	388,000	195,515	115,363	310,878	192,485	30,458	3.9	55,770	86,228	3.11
1983	122,500	367,500	9,000	376,500	214,843	111,866	326,709	161,657	4,502	17.2	245,960	250,462	4.48
1984	129,000	387,000	9,500	396,500	172,879	92,132	265,011	223,621	81,227	3.6	51,480	132,707	1.97
1985	127,500	382,500	10,000	392,500	95,594	66,933	162,527	296,906	177,791	-6.4	-91,520	88,271	1.25
1986	128,500	385,500	10,500	396,000	178,655	111,163	289,818	217,345	57,898	3.1	44,330	102,228	3.26
17 Year Total	2,137,000	6,411,000	132,500	6,543,500	2,130,190	1,421,648	3,551,838	4,413,310	2,152,301	4.9	70,070	2,222,371	33.44
Average	125,706	377,118	7,794	384,912	125,305	83,626	208,932	259,606	126,606	0.2882	4,122	130,728	1.97 (e)

Footnotes:

- (a) Annual Farm Delivery Requirement (FDR) computed as 3.0 AF/acre times irrigated acreage.
(b) Column (8) minus [15% of Column (4) plus 90% of Column (6)].
(c) Obtained from DWR Fall Groundwater Maps.
(d) Computed using 10% average specific yield, resulting in 14,300 AF for each foot of change in depth.
(e) Seventeen year average 117 percent of normal.

F. Institutional Programs

1) Groundwater Monitoring Programs

Well Water Levels

The USBR and DWR act as clearing houses to gather well water-level data from agencies and organizations in the local area. The District has been a participant for many years and shares information with these and other agencies.

III. HYDROGEOLOGIC CHARACTERISTICS

A. Groundwater Basin Description

San Joaquin Basin Hydrologic Study Area

As stated in DWR's bulletin 118-80 the San Joaquin Valley is divided into 15 separate basins, largely based on political considerations. Division into these basins is essential for groundwater management, since management of the San Joaquin Valley as a whole is impractical. Division along existing water agency boundaries would result in basins with technical problems in conducting of management activities. As such, the District lies in three basin designations including the Kings, Kaweah, and Tulare Lake; the majority of the land is included in the Tulare Lake Basin.

B. Local - Aquifer Characteristics

1) Geology - Overview

An enormous aquifer system lies beneath the District and extends the length and breadth of the San Joaquin Valley. The valley is a broad structural trough, with the Sierra Nevada mountains on the east and the Coast Range mountains on the west. The Sierra Nevada basement rock extends from the foothills on the east, sloping downward to the southwest at 4° - 6°. Consolidated and unconsolidated continental and marine deposits from both the Sierra Nevada and the Coast Range mountains overlie the basement complex. Unconsolidated alluvial deposits make up most of the basin's freshwater aquifer (USGS Water Supply Paper 1999-H, 1972).

Interspersed within the unconsolidated deposits that comprise the useable aquifer in the region are a number of clay layers that can act as confining beds. The confining bed that has greatest significance to Kings County Water District is known as the Corcoran Clay, or E-Clay. The E-Clay is thought to underlie most of the District; information from drilling of wells indicates the E-Clay terminates in a line trending from near Laton to the

intersection of State Highway 198 and the County line. One other significant clay layer that also partially underlies Kings County Water District is the A-Clay. This clay lens can pose problems along the western boundary of the District by limiting the vertical movement of water in the aquifer. In a series of wetter years, this can pose a significant impact on farming activities in this area. Figure 9 shows the horizontal extent of the major confining clay layers in the area. Figure 10 shows a generalized geologic cross section of the District .

Soils

Soils in the District and vicinity range from coarse sands to heavy clays. In the central and western portions of Kings County Water District the soils generally have a higher clay content. These soils were deposited in the valley trough during flood periods and are derived from mixed granitic and sedimentary rocks from both the Sierra Nevada and Coast Range Mountains. Soils in the eastern portion of the District generally have higher sand content and are derived mostly from granitic Sierra Nevada sediments deposited on alluvial fans.

Soils throughout the vicinity of Kings County Water District are stratified, with interspersed sandy and clayey streaks. Figure 11 is a composite of USDA soil survey maps which cover the District.

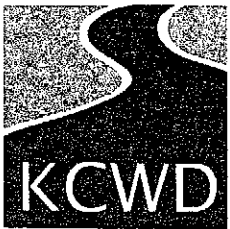
2) Well Yields

Well yields within the District range from about 400 to over 3,000 gallons per minute (gpm), with most wells producing 1,500 to 2,000 gpm.

3) Storage Capacity

Defining the useable groundwater reservoir as the unconfined aquifer lying above the E-Clay, an estimated groundwater storage capacity can be calculated. The elevation of the base of the E-Clay averages about 400 feet below sea-level within the District, with an average thickness of around 80 feet. The average ground surface elevation in the District is about 260 feet, resulting in an average total depth for the unconfined aquifer of about 580 feet. Assuming that it is undesirable to have the water table less than ten feet from the ground surface, the average thickness of the useable aquifer is around 570 feet. Applying an average specific yield of 0.11, and multiplying by the total District area of 143,000 acres results in an estimated total unconfined aquifer storage capacity of 8,900,000 AF.

Kings County Water District
General Extent of A and E Clays



KINGS COUNTY WATER DISTRICT

Legend

- Clay layer
- Highway
- Street
- Kings County Water District

GROUNDWATER MANAGEMENT PLAN

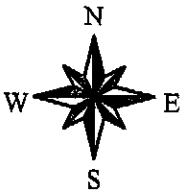
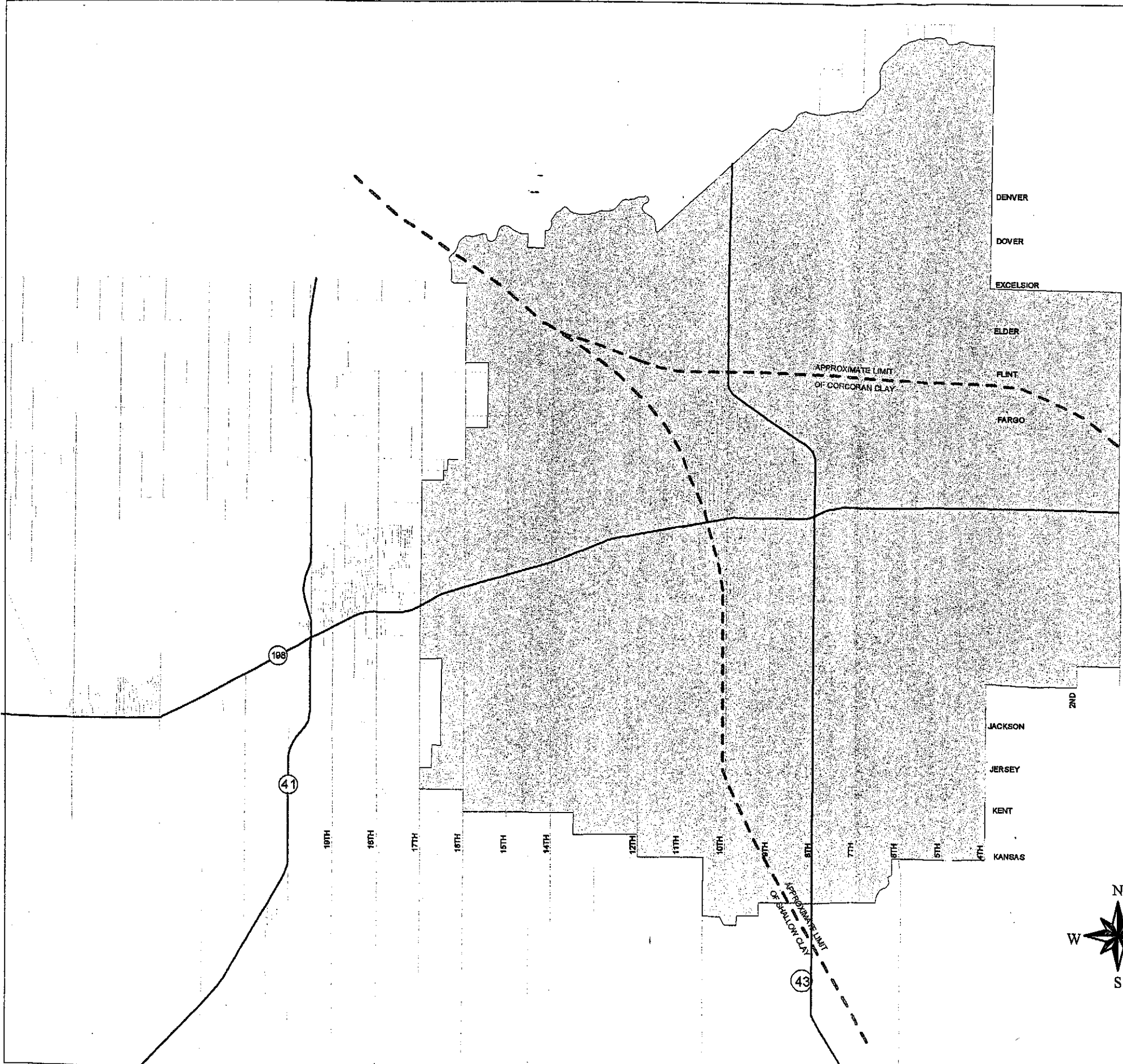
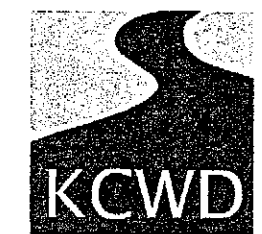


Figure 9



KINGS COUNTY WATER DISTRICT



SIMPLIFIED GEOLOGIC CROSS-SECTION

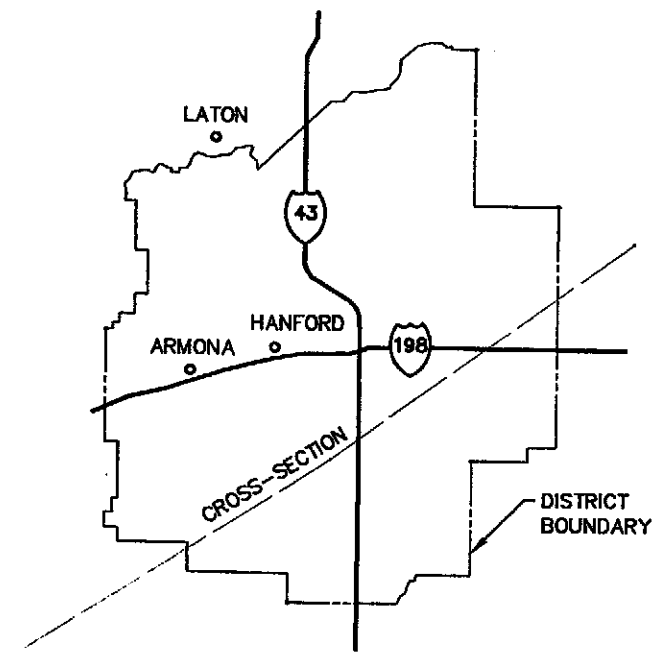
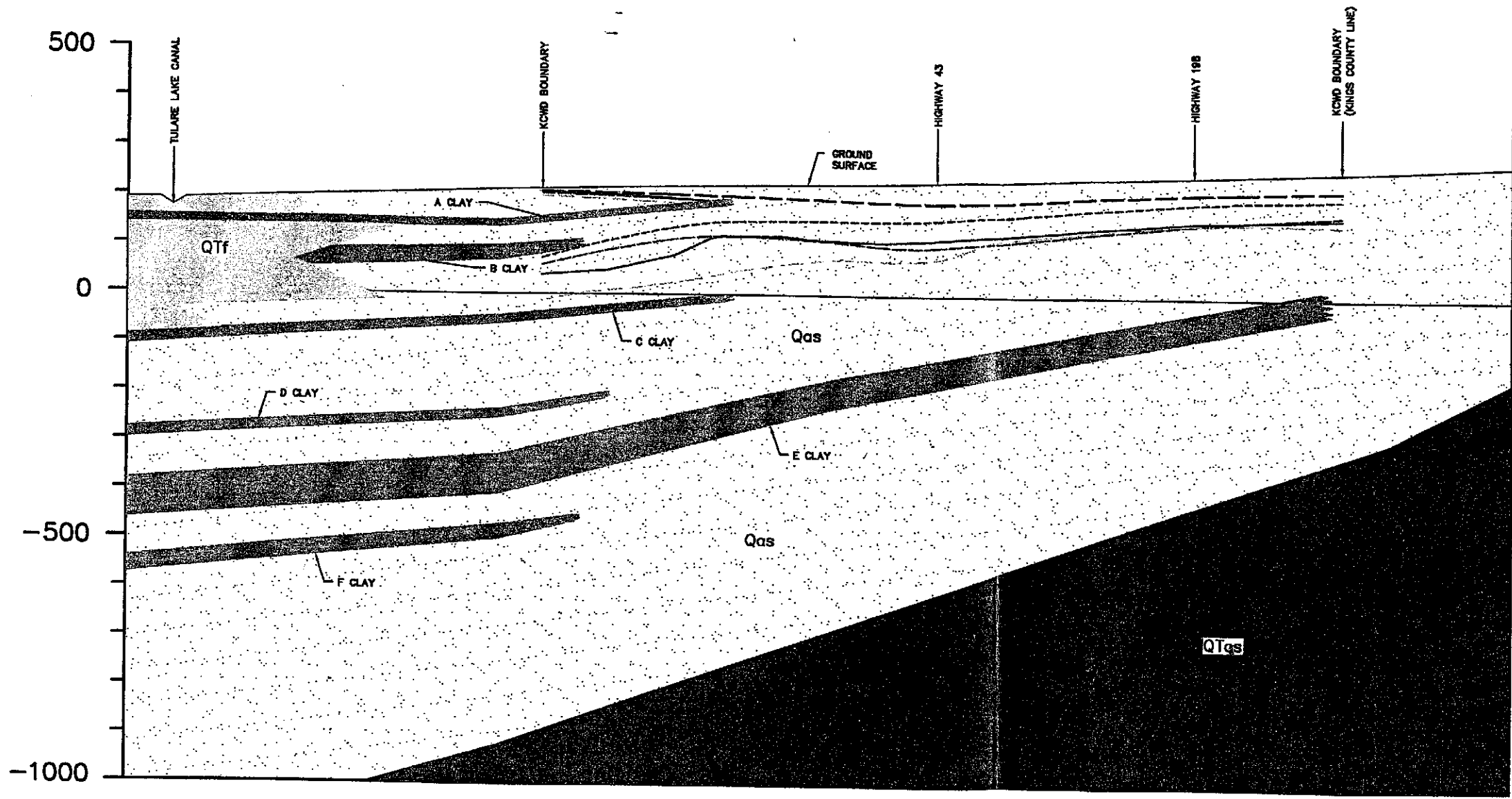


FIGURE 10

Elevation (feet above mean sea level)



LEGEND

- Qas - QUATERNARY ALLUVIUM - SIERRA NEVADA ORIGIN
- Qtf - TERTIARY AND QUATERNARY FLOOD BASIN, LACUSTRINE AND MARSH DEPOSITS
- Qtas - TERTIARY AND QUATERNARY CONTINENTAL DEPOSITS

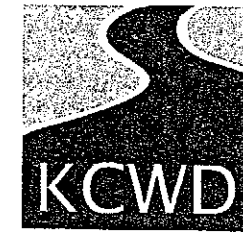
REF: U.S.G.S. WATER SUPPLY PAPER 1999-H (1959)

WATER SURFACE ELEVATIONS

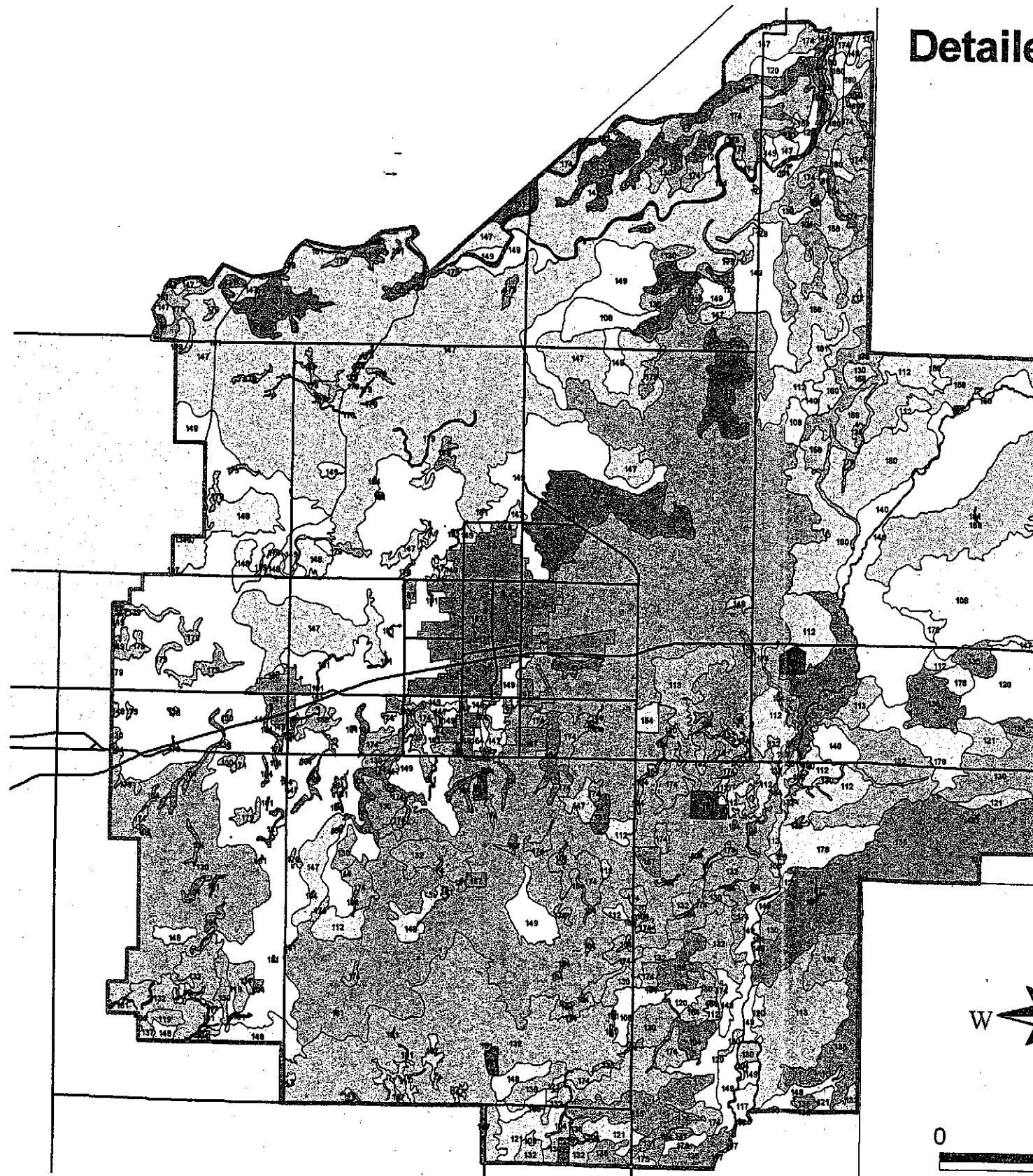
- 1963 - SPRING
- 1970 - FALL
- 1994 - SPRING
- 1994 - FALL
- 1995 - SPRING

EST. 1968
PROVOST & PRITCHARD
 ENGINEERING GROUP
 200 WEST CROMWELL AVENUE
 FRESNO, CALIFORNIA 93711-5102
 559/440-2700 FAX 559/440-2715
 Job No. 21920101-G
 Dwg. No. 94-0063

Detailed Soil Map

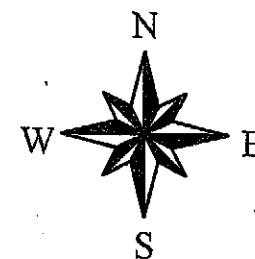


KINGS COUNTY WATER DISTRICT



Detailed Soil Map-Wide Coverage

- Kcwd Boundary
- Kcwd Soil Types**
- 104 Cajon Sandy Loam
- 108 Corona Silt Loam
- 112 Excelsior Sandy Loam
- 113 Garces Loam
- 117 Goldberg Loam, Drained
- 119 Grangeville Sandy Loam, Saline-Alkali
- 120 Grangeville Fine Sandy Loam, Partially Drained
- 121 Grangeville Fine Sandy Loam, Saline Alkali, Partilly Drained
- 130 Kimberlina Fine Sandy Loam, Saline Alkali
- 131 Kimberlina Fine Sandy Loam, Sandy Substratum
- 132 Kimberlina Saline Alkali-Garces Complex
- 134 Lakeside Loam, Partially Drained
- 135 Lakeside Clay Loam, Drained
- 137 Lemoore Sandy Loam, Partially Drained
- 140 Melga Silt Loam
- 147 Nord Fine Sandy Loam
- 148 Nord Fine Sandy Loam, Saline-Alkali
- 149 Nord Complex
- 154 Pits and Dumps
- 158 Remnoy Very Fine Sandy Loam
- 167 Urban Land
- 174 Wasco Sandy Loam 0 to 5% Slopes
- 178 Westhaven Clay Loam, Saline-Alkali, 0 to 2% Slopes
- 179 Whitewolf Coarse Sandy Loam
- 180 Youd Fine Sandy Loam
- 181 Water Surface



0 2 4 Miles

Ref. - USDA Soil Survey Map

GROUNDWATER MANAGEMENT PLAN

Figure 11

IV. GROUNDWATER CONDITIONS

A. Historical Conditions

1) Groundwater Levels

Prior to development of the Kings County Water District, regional groundwater levels were typically within ten feet of the ground surface. As land was brought into agricultural production, and with the advent of deep well turbine pumps, groundwater levels began to decline. By 1950, water levels had begun a sharp decline that continued into the mid-1970's. In this period a significant portion of the unconfined aquifer was dewatered and a large cone of depression centered on lands south of the District.

Beginning in the mid-1970's and continuing to the present, is a trend of much slower groundwater decline. Water levels have continued to fluctuate in response to drought and flood years, but have not exhibited nearly as strong a downward trend. This slowing in groundwater level decline probably resulted from increased groundwater inflow induced by the large cone of depression that has formed in the region and by the activities to import other water and utilize flood water for intentional groundwater recharge.

Water levels in wells tapping the confined aquifer in the region, (below the E-Clay) also declined precipitously through the 1950's and 60's. However, due to the confined nature of the aquifer, these declines track the piezometric or pressure surface of the groundwater, and therefore do not indicate a physical reduction of water in storage in the confined aquifer. This downward trend reversed dramatically in the mid-1960's in response to initiation of delivery of imported surface water from the USBR's Central Valley Project (CVP). This surface water supply resulted in decreased pumping from beneath the E-Clay in regions west of Kings County Water District. Water levels in wells pumping from the confined aquifer once again began to decline steeply in the early 1990's when imported water supplies declined as a result of an extended drought and the restrictions that the 1992 CVPIA imposed on Delta exports.

2) Groundwater Quality

Overall groundwater quality has not appeared to change significantly over the years. As discussed previously, groundwater quality is generally better on the east side of the District.

B. Current Conditions

1) Groundwater Levels

The most recent period for which well water level contour maps have been prepared for the Kings County Water District is spring 2000. In the spring of 2000 water levels in wells pumping from the unconfined aquifer ranged from about 220 feet in elevation in the northwest corner of the District to near sea-level on the District's southern edge. Direction of groundwater flow in the District, for the unconfined aquifer (above the E-Clay), is generally from northwest to southeast.

a) Estimated Pump Lift

Depth to standing water in wells in Kings County Water District ranged from about 55 feet to 164 feet in spring 2000. These data were gathered prior to the start of the pumping season.

C. Groundwater Overdraft

The approach to estimate overdraft involves using historical well water-level measurements during a hydrological base period. The base period must extend for a long enough time that both wet periods and droughts are covered, and the water supply conditions approximate the average. The term overdraft is used in this report to indicate a long-term water level decline within an area during an average hydrologic base period. It is not used to describe short-term water level declines during periods of drought.

The procedure to estimate overdraft from well water level measurements uses many measurements over a long period of time. In the Kings County Water District region, measurements are made in the winter or early spring, following a period of minimal pumping, and again in the fall, following a period of heavy pumping. The complete water level data record can be used to prepare well water level hydrographs and to determine long-term water level changes. A well water level hydrograph is a plot of depth to water versus time for a particular well. After the well water level hydrographs were prepared, the trends in the water levels in the base period were closely examined. As expected, in most agricultural areas the annual low values are in the late summer or early fall, at the end of a long irrigation season, and annual high values are in the winter or early spring, just before pumping begins for the next growing season.

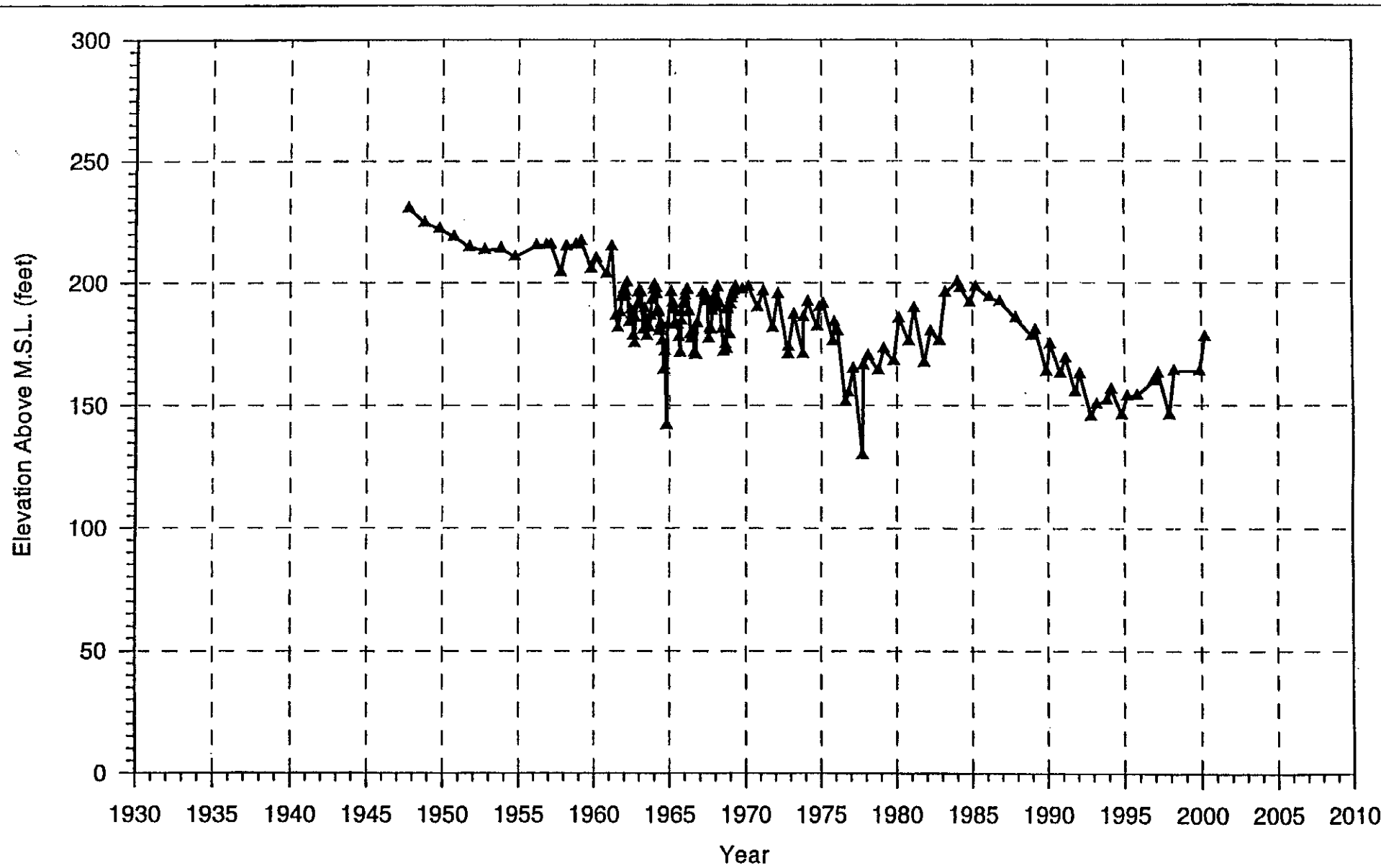


Figure 12-1

Kings County Water District
Groundwater Management Plan

Water Level Hydrograph
Well 18S 21E 10R1

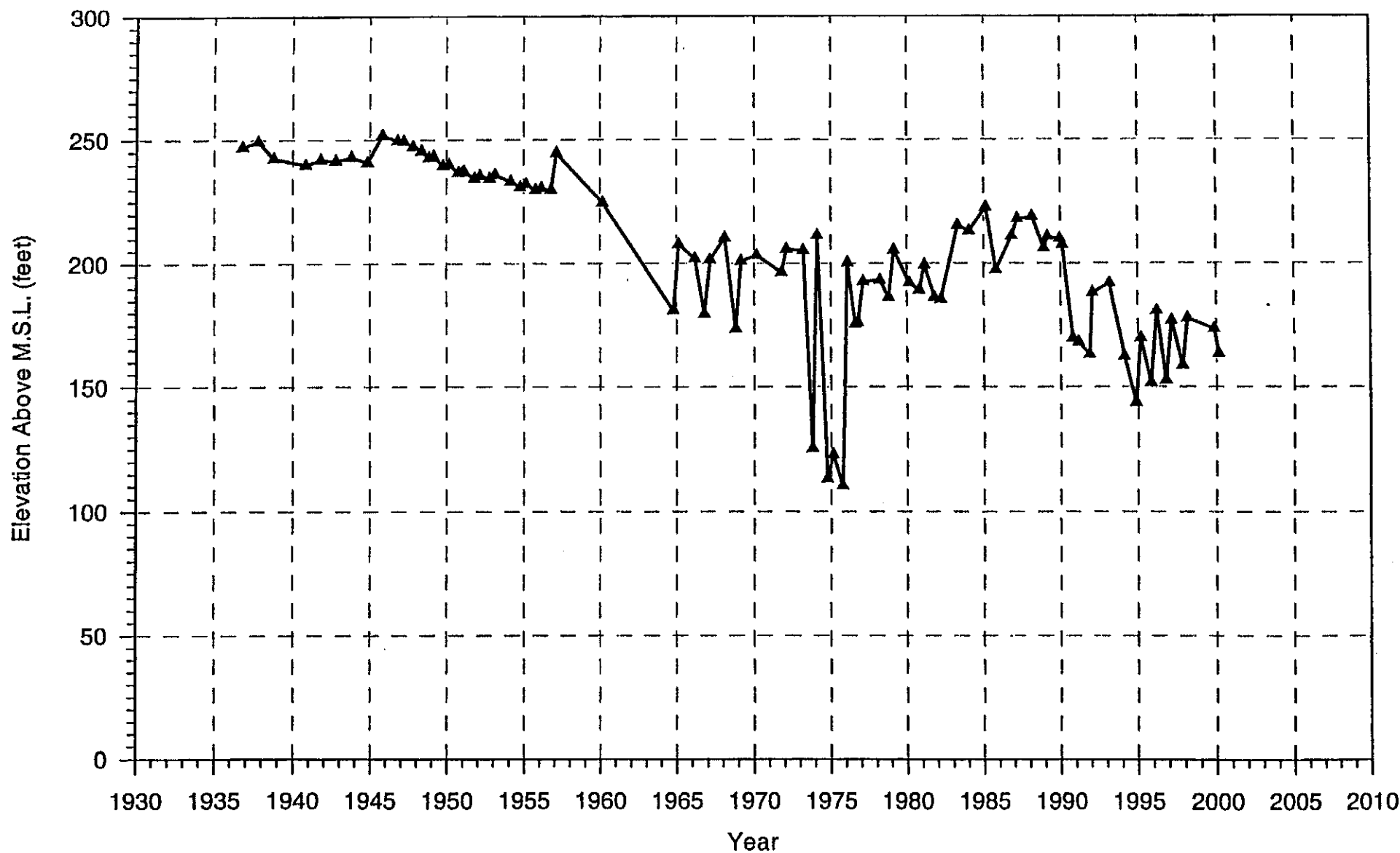


Figure 12-2

Kings County Water District
Groundwater Management Plan

Water Level Hydrograph
Well 18S 23E 15A1

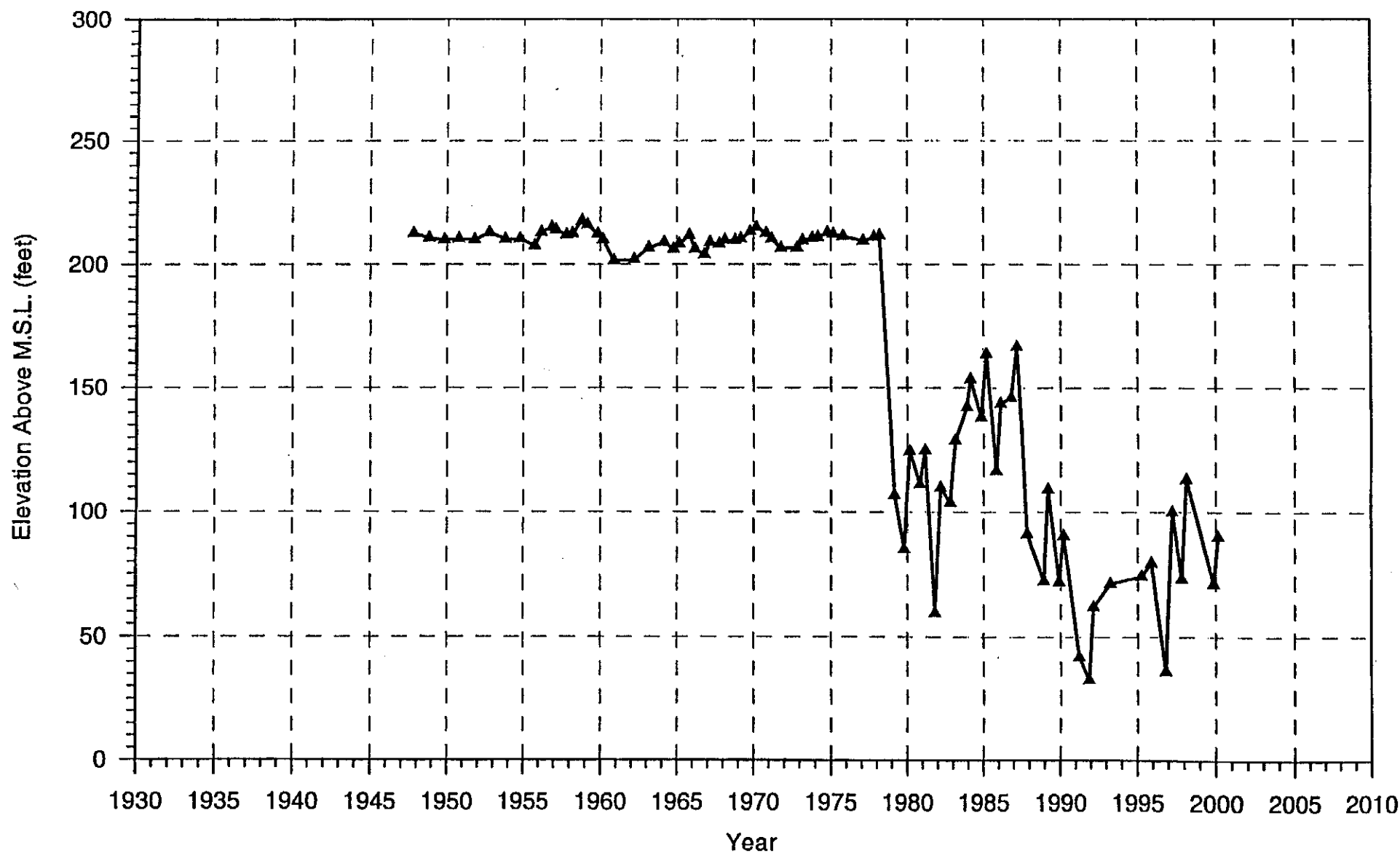


Figure 12-3

Kings County Water District
Groundwater Management Plan

Water Level Hydrograph
Well 19S 21E 30A1

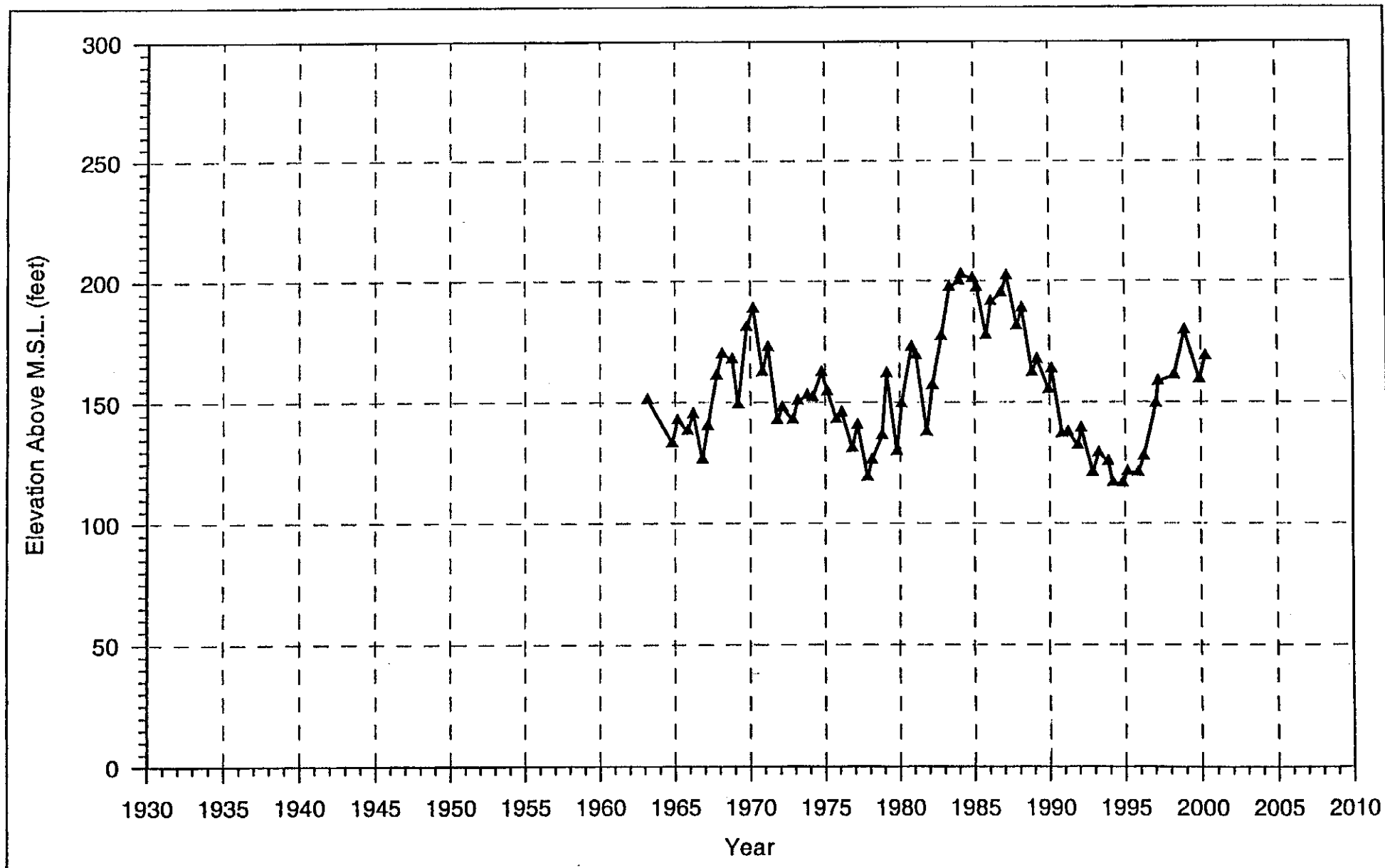


Figure 12-4

Kings County Water District
Groundwater Management Plan

Water Level Hydrograph
Well 19S 22E 15M1

Linear regressions were performed on the data within the base period that appeared valid and representative of the water level conditions. The slope of these "best-fit" lines were used as the long-term average annual changes in groundwater level.

The base period for this analysis was taken to be from 1975 to 1993. The wells pumping from above the E-Clay all show a consistent trend through this period. The Kings River, the major hydrological factor in the area with respect to groundwater replenishment, was also a near-average period (105% of long-term average runoff) with respect to both flood and drought episodes. Four representative hydrographs showing depth to water in wells in the District are provided on Figures 12-1 through 12-4.

The hydrographs indicate gradual, long-term water level declines in the District for the chosen hydrologic base period. To determine the change in groundwater storage, a parameter known as "specific yield" is multiplied by the average water level change during the period evaluated. Specific yield is the ratio of the volume of water which will drain freely from a material to the total volume of the formation. Based upon estimates of specific yield by the USGS and the DWR, the average specific yield of the unconfined aquifer was estimated to be about eleven percent for the District. Using these specific yields, the District's groundwater overdraft is calculated to be about 12,000 AF per year for the chosen hydrologic base period. During this same period, additional water supplies were brought into the District through various programs that amounted to 20,000 AF/yr, indicating that overdraft could be as much as 32,000 AF/yr.

D. Extraction and Perennial Yield

Groundwater extractions by Kings County Water District was covered previously. Perennial yield, or sustained yield, is difficult to quantify because of the shared nature of the aquifer and uncertainty in defining the term. In this analysis, perennial yield is defined as the maximum quantity of water that can be withdrawn annually from a groundwater resource under a given set of conditions without causing an undesirable result.

One factor complicating the estimate of perennial yield for Kings County Water District is that the region is not a "closed" groundwater basin. That is, groundwater in the region is hydraulically connected to groundwater in adjacent areas within both the Kings Basin and the Kaweah Basin. If groundwater management activities substantially raised static water levels, subsurface inflow would decrease, subsequently decreasing perennial yield.

Based on the period of 1970 to 1994 the estimated overdraft for the Kings

County Water District is approximately 32,000 af per year. Also according to district records the average ground water pumped per year over the period of 1970 to 1986 was 259,607 af per year. This period (1970-1986) relates to above average hydrologic conditions. Therefore in order to normalize the value for average groundwater pumped per year the average pumpage is reduced by 13%. Subtracting the overdraft from the normalized average pumping results in an estimate of the perennial yield of 193,339 af per year.

V. MANAGEMENT PLAN ELEMENTS

As identified in the AB 3030 Ground Water Management Act of 1992, 12 elements may be included in a ground water management plan. These elements play a role in evaluating or operating a ground water basin so that ground water can be managed to maximize the total water supply while protecting ground water quality. They form a basic list of data collection and operation of facilities that may be undertaken by an agency operating under this act. The 12 elements are addressed in this ground water management plan.

A. Control of Saline Water Intrusion

Water supplies both surface and groundwater are of excellent quality. There is no known area of saline water.

B. Identification and Management of Wellhead Protection Areas and Recharge Areas

The Federal Wellhead Protection Program was established by Section 1428 of the Safe Drinking Water Act Amendments of 1986. The purpose of the program is to protect groundwater sources of public drinking water supplies from contamination, thereby eliminating the need for costly treatment to meet drinking water standards. The program is based on the concept that the development and application of land use controls, usually applied at the local level in California, and other preventative measures can protect groundwater.

A Wellhead Protection Area (WHPA), as defined by the 1986 Amendments, is "the surface and subsurface area surrounding a water well or wellfield supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield". The WHPA may also be defined as the recharge area that provides the water to a well or wellfield. Unlike surface watersheds that can be easily determined from topography, WHPA's vary in size and shape depending on subsurface geologic conditions, the direction of groundwater flow, pumping rates, and aquifer characteristics. There are several different methods typically used to delineate the lateral boundaries of a WHPA.

Under the 1986 Amendments, states are required to develop an EPA-approved Wellhead Protection Program. To date, California has no state-mandated program, but instead relies on local agencies to plan and implement programs. This is one of the factors that prompted the State Legislature to enact AB 3030. Wellhead Protection Programs are not regulatory in nature, nor do they address specific sources. They are designed to focus on the management of the resource, rather than control a limited set of activities or contaminant sources.

As Kings County Water District does not provide drinking water to the public, Wellhead Protection Areas are not currently applicable to this plan. Depending on the relationship developed with the City of Hanford and Armona Community

Services District (see item K of this section), delineation of WHPA's may be addressed at a later date.

C. Regulation of the Migration of Contaminated Groundwater

Groundwater contamination can originate from many sources or activities. Clean-up of contaminated groundwater is a complex and expensive task, generally involving a number of organizations. Agencies with roles to play in mitigating groundwater contamination include the California Regional Water Quality Control Board (RWQCB), the California Department of Toxic Substances Control (DTSC), and the U.S. Environmental Protection Agency (EPA). Each agency has its own set of regulatory authorities and expertise to contribute. The degree to which they participate depends on the nature and magnitude of the problem. If Kings County Water District identifies a groundwater contamination problem, the District would refer the information to the appropriate regulatory agency.

D. Administration of a Well Abandonment and Well Destruction Program

Existing State and Kings County law requires that owners or lessees properly destroy their abandoned wells. Proper destruction of abandoned wells is necessary to protect groundwater resources; abandoned or improperly destroyed wells can result in water of different chemical qualities from different strata mixing, and degrading groundwater. The responsibility for administration and enforcement of the County well ordinance will remain with Kings County.

E. Mitigation of Conditions of Overdraft

Overdraft of the groundwater supply can lead to a variety of problems, including subsidence and increased pumping costs. Additionally, if overdraft continues unchecked, the groundwater supply may not be reliable when surface water is scarce, as in a time of extended drought.

Groundwater overdraft is due to an imbalance in the rates of extractions and replenishment. There are several methods to correct this imbalance. The first is to decrease the extraction to match the rate of replenishment. The second is to increase groundwater replenishment to match the extraction rate. The third method is a combination of the first two, to balance replenishment and extraction. Each of the methods are applied over an extended period, making use of the storage capacity of the aquifer. Extractions can exceed replenishment in drought periods as long as replenishment equally exceeds extractions in wetter periods.

The overdraft has been estimated to average around 12,000 AF per year in the District. Factors that will affect the future rate of overdraft include:

1. The surface water supplies available to Kings County Water District through the Kings and Kaweah Rivers.

2. The surface water supplies available to Kings County Water District through the major statewide projects consisting of the Central Valley Project and State Water Project.
3. Future water demand in the District.

Overdraft could be a significant concern if any activities were to result in increased pumping, reduced recharge, and/or increased groundwater outflow. Periodic analyses of groundwater overdraft, perhaps every five years, are needed to reassess the need for mitigation of overdraft.

Possible mitigative measures include reducing groundwater pumping by reducing District water demand and increasing the District's surface water supply. Demand reduction can be effected by cropping changes or land fallowing. Increasing Kings County Water District's surface water supply would rely on improving the District's ability to use excess Kings River and Kaweah River flows. Flood water appears adequate on the Kings River to mitigate the overdraft condition if sufficient recharge capacity can be developed.

F. Replenishment of Groundwater Extracted by Water Producers

Replenishment of groundwater is an important technique to manage a groundwater supply and mitigate a condition of overdraft. The estimated overdraft for the District may likely be offset with currently proposed recharge projects using excess Kings River flows (flood releases from Pine Flat Reservoir).

G. Monitoring of Groundwater Levels and Storage

The purpose of a groundwater level monitoring program is to provide information that will allow computation of the change in groundwater storage. Kings County Water District will continue their current program of measuring well water levels in the spring and fall, in cooperation with the USBR and DWR. Contour maps depicting levels of water in wells within the District and surrounding area will be prepared on an annual basis, along with estimates of changes in groundwater storage.

H. Facilitating Conjunctive Use Operations

Conjunctive operation of a groundwater basin is defined in DWR Bulletin 118-80 as:

"Operation of a groundwater basin in coordination with a surface water reservoir system. The basin is intentionally recharged in years of above average precipitation so groundwater can be extracted in years of below average precipitation when surface water supplies are below normal."

Such management results in the groundwater storage being reduced in dry periods and increased in wetter periods. To avoid a condition of overdraft, replenishment must balance extraction over the long-term.

A conjunctive use program requires:

- A source of surface water in years of high surface water supply.
- Recharge facilities.
- Conveyance facilities to import and export water to and from the groundwater storage area.
- Available storage capacity in the aquifer.
- Extraction facilities.
- Distribution facilities for surface and groundwater.

Kings County Water District currently has facilities in place to operate a conjunctive use program, and in fact, has been operating in such a manner for some time. Additional measures proposed in this plan are hoped to provide a greater capacity for using excess Kings River flows, and hopefully a long-term groundwater balance can be obtained.

I. Identification of Well Construction Policies

Improperly constructed wells may result in contaminated groundwater by establishing a pathway for pollutants entering a well through drainage from the surface, allowing mixing between aquifers of varying water quality, or the unauthorized disposal of waste into the well. Kings County has enacted and is responsible for enforcing a County Well Ordinance that regulates well construction.

J. Construction and Operation of Groundwater Management Facilities

Effectively managing a groundwater supply requires facilities that protect the quality and assure that the quantity of groundwater in storage is sufficient to meet long-term operational goals. Kings County Water District currently has facilities in place to meet these management requirements.

K. Development of Relationships with Federal, State, and Local Regulatory Agencies

The development of relationships among the groundwater management district and the various regulatory agencies is an important part of an effective groundwater management plan. This plan will be submitted to DWR and the District will continue to work with KRCD, DWR, and USBR to monitor and report groundwater conditions within and around the District. Groundwater management activities will be coordinated with surrounding groundwater management agencies as opportunities exist.

L. Review of Land Use Plans and Coordination with Land Use Planning Agencies

An important component of developing a groundwater management plan is the review of land use plans for the surrounding area or basin, and coordinating efforts with regional and local land use planning agencies. Land use planning activities in unincorporated areas of Kings County are performed by the County of Kings' Department of Public Works planning division, and overseen by the Kings County Planning Commission and the Board of Supervisors. Responsibility for land use planning in incorporated areas lies with each community's planning staff. The City of Hanford's staff, planning commission and City Council are responsible for land use planning within the City's Sphere of Influence.

VI. GROUND WATER MANAGEMENT PROGRAM

It is recognized that the District has undertaken many aspects of groundwater management over past years. Of the potential management plan elements, the most critical items to the success of the program will be actions that lead to stabilization of groundwater levels. Groundwater quality is not a major issue due to the excellent current water quality and no known areas of quality impairment or areas of contamination. Additionally, it should be noted that the District has limited conveyance facilities and accordingly, will endeavor to pursue favorable activities through the ditch companies, water and irrigation districts, County, and the water conservation district.

The historical information previously cited is useful in understanding the goals and purpose for establishment of the District. It is planned that this information will be updated as needed, but is not expected to be more often than every five to ten years.

It is expected that the program as outlined here will be evaluated and modified yearly to identify and document changes due to hydrologic conditions and to identify the elements being implemented.

A. Program Components

This part of the plan lists the specific activities that will be taken to embark on working with others to assure the continued success of current programs and identify additional elements that may be added.

The program has been divided into four parts. Within these subdivisions, certain elements have been identified that may be implemented as part of the program. The program will be evaluated annually in the fall to determine and define the specific elements that will be undertaken in the following year and to evaluate the effects of programs from the previous year.

- 1) Monitoring and evaluation
- 2) Develop Memorandum of Understanding
- 3) Activities to increase conjunctive use
- 4) Purchase of water supplies

1) MONITORING AND EVALUATION OF EXISTING PROGRAMS

To identify the results of activities in the District and basin, it is important to continue these activities. Of the on-going program, the following are the proposed activities:

- a. Groundwater Mapping
 - i. Continue the semi-annual groundwater level measurements,

preparation of maps of Lines of Equal Elevation of Water in Wells for the Unconfined Aquifers, and tabulate the annual groundwater level change.

- ii. Prepare a water quality map of electrical conductivity for 1997.
- iii. Prepare results of electrical conductivity for wells at 5-year intervals starting in 2005.

b. Tabulate the change in groundwater storage on an annual basis.

c. District facilities

- i. Basins: evaluate basin configuration, capacity, percolation rate, and local impacts.
- ii. Old River: evaluate the same information as for basins. Review need for additional dams.

d. Tabulate water supplies

e. Calculate water demands

f. Prepare water budget

2) DEVELOP MEMORANDUM OF UNDERSTANDING WITH LOCAL AGENCIES AND DITCH COMPANIES

As discussed previously, there are many systems within the District that may be operated or utilized differently to augment water supplies. Possibilities include:

- a. Dual use of storm drain basins with the City of Hanford for intentional recharge
- b. Construction of laterals for direct use of flood water from the existing canal system
- c. Construction of intentional recharge facilities
- d. Purchase and delivery of other available water supplies.

All of these actions require working with other local agencies and an agreement to utilize or operate facilities for an extended time. Memorandums of understanding should be executed in the immediate future with Peoples Ditch Company, Last Chance Water Ditch Company, Lakeside Irrigation Water District, Lakeside Ditch Company, and the City of Hanford to examine the potential for alternate operation and use. Examples of potential project

elements are provided in Appendix C.

3) INCREASED CONJUNCTIVE USE CAPACITY

To correctly evaluate the programs currently in place, several activities are recommended. The first is to evaluate the potential benefits of intentional recharge basins throughout the District. It is expected that many of the basins on the western edge of the District are of minor value due to the limiting nature of the A-clay. When an average or wet season presents itself, it is recommended that recharge records be kept and the affect on the local aquifer be evaluated.

It is also of important to identify the water supply required to bring the District overdraft in balance. Recent analysis suggests a groundwater deficit of 12,000 AF/y. However, this includes approximately 20,000 AF/y of water purchased, on average, through the CVP system. With the enactment of the Central Valley Project Improvement Act (CVPIA), surface water costs from the CVP are significantly increased. Impact to the historical average annual quantity may be reduced.

Also, studies should be performed that identify potential new recharge areas. It is thought that potential recharge areas may be present north and east of the limit of the Corcoran clay (E-clay). This needs to be verified.

4) PURCHASE OF WATER SUPPLIES

In addition to facilities, it is also imperative to identify potential sources of water and their cost. This will allow a more informed decision and structured program to determine when water supplies should be purchased. This will include supplies both from within the service area as well as new water supplies.

An evaluation of the financial requirements to acquire potential water supplies available for purchase from ditch companies with the KRWA needs to be accomplished. This will enable the District to determine the financial requirements of the current program and verify its financial value.

B. Program Costs, Funding, and Potential Fees

Establishment of this program and associated elements does not commit the District to spend dollars on any specific subject. Rather as money is available, it allows the District to follow a framework that as opportunities arrive, they may be systematically evaluated and decisions may be made easier and quicker.

C. Implementation Schedule

Upon adoption of the Groundwater Management Plan, the program will be implemented on the following schedule:

1. Immediate data acquisition
2. Evaluation of water demand
3. Tabulation of water supplies

Programs

A. Monitoring and evaluation:

Evaluate the Old River, each recharge basin configuration, capacity, percolation rate, and local impacts. Continue on-going groundwater data acquisition, monitoring, mapping and evaluation. Water levels will be acquired and reviewed semi-annually. Water quality to be acquired and reviewed every five years. Identify water supplies required to bring District into balance.

B. Other agency relationships: Formalize with MOU (complete by 12/02)

Execute Memorandums of Understanding with the City of Hanford, Peoples Ditch Company, Last Chance Water Ditch Company and Lakeside Irrigation Water District. Immediately begin developing relationships with Kaweah Delta Water Conservation District, and Tulare, Alta, and Consolidated Irrigation Districts.

C. Increase conjunctive use: Initiate in 1/02

Review and understand canal capacities
Identify constraints
Investigate potential for increased intentional recharge
Investigate potential for new subsurface laterals.

D. Purchase water supplies: Initiate in 6/02

Review assessment program
Review availability and cost for State Water Project, Central Valley Project, and Kings River Water

APPENDIX A
Kings County Water District Resolution

Resolution No. 2001-7

On December 6, 2001, the Board of Directors of the District adopted Resolution No. 2001-7, entitled "Resolution of the Board of Directors of the Kings County Water District Revising Groundwater Management Plan." This resolution adopted the District's revised Plan. A copy of Resolution No. 2001-7 is enclosed.

Resolution No. 1993-1

On January 7, 1993, the Board of Directors of the District adopted Resolution No. 1993-1, entitled "Kings County Water District Board of Directors Resolution Adopting a Groundwater Management Program." This resolution adopted the District's existing Plan. A copy of Resolution No. 1993-1 is also enclosed.

RESOLUTION NO. 2001-7

RESOLUTION OF THE BOARD OF DIRECTORS
OF THE KINGS COUNTY WATER DISTRICT
REVISING GROUNDWATER MANAGEMENT PLAN

The Board of Directors of the Kings County Water District does hereby find:

WHEREAS, on January 7, 1993, the Board of Directors of the Kings County Water District ("District") adopted Resolution No. 1993-1, entitled "Kings County Water District Board of Directors Resolution Adopting a Groundwater Management Program;" and

WHEREAS, the Groundwater Management Plan ("Plan") adopted by Resolution No. 1993-1 has not been revised; and

WHEREAS, given the time since the adoption of the District's Plan in 1993, the Board directed the District's Consulting Engineer to review the Plan and propose appropriate revisions; and

WHEREAS, the District's Consulting Engineer has reviewed the Plan and presented his recommendations and proposed revisions thereof at the District's Regular Meetings held on October 4, 2001, November 8, 2001, and December 6, 2001; and

WHEREAS, the purposes for which the District was formed were stated by the Supreme Court of the State of California, as follows:

The Kings County Water District was organized February 24, 1954, under the County Water District Law. It comprises approximately 150,000 acres. It was organized primarily to protect the underground water supplies of the area from excessive pumping and to guard against the transportation of the groundwater to areas outside the District. Its purposes and functioning generally have been in accordance with the aims and methods approved by law for such an organization. [. . .] *The protection, conservation and replenishment of the underground water supplies is one of the main functions of the water district in question.* Atchison, Topeka & Santa Fe Railway Co. v. Kings County Water District (1956) 47 Cal 2d 140, 143, 146 (emphasis added; citations omitted).

WHEREAS, the District has the power to and may do any act necessary to furnish sufficient water in the District for any present or future beneficial use; and

WHEREAS, the District may store water for the benefit of the District, conserve water for future use, and appropriate, acquire, and conserve water and water rights for any useful purpose, including groundwater banking of surface waters, the reclaiming of the return flow of imported waters and other waters which would not otherwise be present in the underground water bearing

formations, and the management of such waters; and

WHEREAS, the District may operate water rights, works, property, rights, and privileges useful or necessary to convey, supply, store, or make use of water for any purpose authorized by the County Water District Law; and

WHEREAS, the District may sell water or the use thereof for any useful purpose and whenever there is a surplus, may dispose of the surplus to municipalities, public agencies, or consumers, including farmers, located within or without the District; and

WHEREAS, upon review of the District's Plan and upon receipt of recommendations, ideas and suggestions from the District's Consulting Engineer, the Board of Directors finds that it is in the best interests of the District, and the present and future owners of land and users of water within the District, to revise the Plan.

NOW, THEREFORE, the Board of Directors of the Kings County Water District does hereby resolve and adopt the revised groundwater management plan prepared by the District's Consulting Engineer in the form attached hereto as Exhibit A, entitled "Kings County Water District Groundwater Management Plan Date of Enactment: January, 1993-Date of Last Revision: November 2001."

WHEREFORE, the foregoing Resolution was passed and adopted at a regular meeting of the Board of Directors of the Kings County Water District held this 4 day of December, 2001, at Hanford, California, by the following vote:

AYES:	Steven P. Dias, Michael Murray, Ernest Taylor and Barry McCutcheon
NOES:	-0-
ABSENT:	Joe Freitas, Jr.
ABSTAIN:	-0-

By: 
STEVEN P. DIAS, PRESIDENT

ATTEST:


DON MILLS, SECRETARY

CERTIFICATE OF SECRETARY

I, Don Mills, the duly appointed Secretary of the Kings County Water District, declare that the foregoing Resolution was passed and adopted at a Regular Meeting of the Board of Directors of the Kings County Water District held on December 6, 2001.

DATED: December 6, 2001.

[DISTRICT SEAL]



DON MILLS, SECRETARY

D:\WP61\KCWD\2001-07.RES

1
2 KINGS COUNTY WATER DISTRICT
3 BOARD OF DIRECTORS RESOLUTION ADOPTING A
4 GROUNDWATER MANAGEMENT PROGRAM

5 RESOLUTION NO: 1993-1

6 WHEREAS, Kings County Water District ("District") is located
7 within a overdrafted groundwater basin as per Water Resources
8 Bulletin, 118-80 entitled Groundwater Basins in California; and

9 WHEREAS, District is authorized, pursuant to AB 255 codified
10 as Part 2.75, commencing with Section 10750 of Division 6 of the
11 Water Code, to adopt a Groundwater Management Program ("Program");
12 and

13 WHEREAS, the District has held a duly noticed public meeting
14 at 10:00 a.m. on October 27, 1992, with relevant materials made
15 available to the public for the purpose of considering comments
16 concerning the Program; and

17 WHEREAS, the Board of Directors of the District at the first
18 public meeting, passed a Resolution of Intention to Adopt the
19 Program, no adverse comments having been received; and

20 WHEREAS, the Program was circulated to owners of water
21 extraction facilities as well as others within the District prior
22 to a Second Public Hearing; and

23 WHEREAS, at the time of the duly noticed Second Public Hearing
24 to consider protests held at 10:00 a.m. on December 15, 1992 no
25 majority protest was registered; and

26 WHEREAS, the Board has made a finding that the Groundwater
Management Program is not a project for purposes of California
Environmental Quality Act ("C.E.Q.A.") or benefits form a

1 categorical exemption as it consists of the operation, repair,
2 maintenance, or minor alterations of existing public or private
3 structures, involving negligible or no expansion of use beyond the
4 previously existing facilities involved in the Program or involve
5 joint projects with other public entities as identified in the Plan
6 which are already engaged in the CEQA process; and

7 THEREFORE, no environmental impact report or negative
8 declaration under CEQA was required; and

9 WHEREAS, the Board of Directors has directed staff to prepare
10 a Notice of Exemption with a brief description of the Groundwater
11 Management Program and existing facilities that comprise parts of
12 the Program, said Notice to be filed with the County Clerk of Kings
13 County with copies of the Notice made available for public
14 inspection, the Notice to be posted on a weekly basis in the office
15 of the County Clerk for thirty (30) days.

16 NOW, THEREFORE, BE IT RESOLVED:

17 Pursuant to the original purposes for which Kings County Water
18 District was formed, the District hereby reaffirms those purposes
19 herein summarized in a quote from the Supreme Court of the State of
20 California which reads as follows:

21 "The Kings County Water District was organized February
22 24, 1954, under the County Water District Law. (Water
23 Code, §§ 30000 - 33901) It comprises approximately
24 150,000 acres. It was organized primarily to protect the
25 underground water supplies of the area from excessive
26 pumping and to guard against the transportation of the
groundwater to areas outside the district. Its purposes
and functioning generally have been in accordance with
the aims and methods approved by law for such an
organization. . . . The protection, conservation and
replenishment of the underground water supplies is one of
the main functions of the water district in question.

(Water Code § 31082)" Atchison, Topeka & Santa Fe
Railway Co. (a corporation), Respondent, v. Kings County
Water District, et al., appellants (1956) 47 Cal2d 140,
302 P2d 1.

and

BE IT FURTHER RESOLVED, In order to continue to achieve its
goals Kings County Water District hereby adopts the Groundwater
Management Program attached hereto as Exhibit "A".

WHEREFORE, this Resolution was passed and adopted this 7th
day of January, 1993, by the following vote:

AYES: Vierra, Mills, Holsonbake, Bairstow, Dias.

NOES: None

ABSENT: None

KINGS COUNTY WATER DISTRICT

By: Frank P. Vierra
President of the Board

ATTEST:

Cheryl Lehn
Cheryl Lehn, Secretary/Manager

cs:\wp51\kwd\1993-1.res\cy

APPENDIX B

Monitoring Program Data/Evaluation

Existing Intentional Recharge Facilities

During the next events when flood or recharge water is available, information will be obtained including flow rate, percolation rate, and maximum water level such that a determination of effective recharge can be obtained.

In the area overlying the A-Clay, information on groundwater levels will be obtained adjacent to the recharge basins so that the effectiveness of the basins can be determined.

APPENDIX C

DRAFT MEMORANDUM OF UNDERSTANDING

BETWEEN

KINGS COUNTY WATER DISTRICT

AND

XXXXXXXXXXXXXXXXXX

ARTICLE I - AGREEMENT

The articles and provisions contained herein constitute a bilateral and binding agreement by and between KINGS COUNTY WATER DISTRICT, a California County Water District ("District") and _____ ("Agency").

ARTICLE II - RECOGNITION

The District has developed a groundwater Management Plan ("Plan"). Agency consents to the Plan, pursuant to Water Code section 10750.8. It is the intent of District to allow and encourage such agencies to coordinate efforts and be a part of the District's Plan by means of a separate Memorandum of Understanding ("MOU") between the Agency and the District.

ARTICLE III - PURPOSE

It is the purpose of this MOU, entered willingly, between District and Agency, to document the interests and responsibilities of both parties in the adoption and implementation of a coordinated Plan. It is also the intent that this MOU will promote and provide a means to establish an orderly process to share information, develop a course of action, and resolve any misunderstandings or differences that may arise.

ARTICLE IV - COORDINATION

There shall be an annual coordinating meeting ("Meeting") between the District and the Agency. District shall give notice to the Agency thirty (30) days prior to date of the Meeting. If there are concerns or questions regarding the Plan, Agency shall transmit its concerns in writing to District seven (7) days prior to the Meeting.

ARTICLE V - OBJECTIONS

The Plan shall be binding on the parties hereto unless superseded by the MOU or amendment thereto.

The Plan shall be effective in all areas within the Agency boundaries. The Plan shall also be effective in any area annexed to the Agency subsequent to the adoption of the Plan.

The initial term of the MOU shall commence on the date hereof and continue for five (5) years, and shall continue year to year thereafter, unless terminated by written notice given by either party at least one (1) year prior to such termination.

In order to avoid disputes regarding various provisions of the Plan, Agency and District agree with respect to the following such provisions:

**KINGS COUNTY WATER DISTRICT, a
California Irrigation District**

by _____, Secretary

by _____

APPENDIX D

POTENTIAL CONJUNCTIVE USE ELEMENTS

1) CONSTRUCTION OF GROUNDWATER MANAGEMENT FACILITIES

Apex Ranch- Groundwater Storage Program

The objective of the Apex Ranch Groundwater Storage Project (Project) is to provide additional water supply to the Kings County Water District (KCWD). The Project seeks to develop a banking program to store available Kings River flows for extraction at a later time. The Project would increase water supply by capturing and storing water that would otherwise be lost from the KCWD.

Apex Ranch (Ranch) is a 400-acre plum, nectarine, peach and walnut ranch located between the Peoples Ditch and an old Kings River channel in the northeast corner of Kings County. The Project involves the purchase of the Ranch and construction of new facilities to allow for excess Kings River flows to be percolated into the ground.

Peoples Ditch Company - Regulation Basin

Peoples Ditch Company is the largest purveyor of water within the District. Its distribution system is strategically located as to afford the potential to both recharge additional water as well as provide flexibility in deliveries. This project envisions a regulation basin located at the junction of the Main Canal and the Settlers Canal. It would function as a regulation facility that would allow temporary excess flows to be captured in the central portion of the system. Currently, surges in the canal cause water to pass through the system and be conveyed past the boundaries to ditches outside the District. Deficiencies are also a problem in that the canal starts to dry up causing growers problems with maintaining uniform flow conditions as well as forcing some to opt for using groundwater.

Peoples Ditch Company - Upgrade Control Structures

In an attempt to allow for increased deliveries in the system it is suggested that a review of the distribution system be made with the intent of identifying improvements that could be made such that increased flows could be experienced with the same canal system. The existing system consists of check structures spaced at approximately 3 miles that are operated manually. Due to the possible water level fluctuations, the canal is operated at times below what may be possible with a more flexible control system.

Riverside Ditch - Martin Ditch

Several years ago, the Martin Basin was purchased to contain and recharge excessive flows on the Riverside Ditch. The basin is located in Section __ T __ S, R __ E, MDB&M at the end of the Riverside Ditch. The basin is approximately 4,000 feet long and 50 feet wide. To maximize the operational and recharge potential, the basin should be excavated 5 to 10 feet with a low flow channel extending throughout its length. The most westerly portion of the

basin has been identified as the area with soil conditions most conducive to intentional recharge of surface waters and should be excavated to maximize this potential.

Riverside Ditch - Excelsior Basin

In 1998, a potential recharge site was located near Excelsior and 11th Avenue which is depressed from the adjacent properties. It was known that this area used to be a slough channel area and the present leasee was approached about leasing the site for intentional spreading of surface water. The 40 acre parcel was leased by the District. Intentional surface spreading of Kings River flood water was performed for the months of December through May. A total of 330 AF of water was recharged. Communication with the existing leasor should continue for potential recharge activities in future years.

Old River

During the past several wet years, the last two retention dams have been washed out. For additional area to be utilized for intentional recharge, the two dams should be replaced.

Peoples Ditch - Construction of Laterals

In an effort to encourage growers to utilize flood water when available, construction of short laterals off of the Main Canal from the headworks to Highway 43 should be considered.

Kaweah Delta Water Conservation District - Flood Basin

Discussions with the KDWCD should continue to establish a new flood basin in the northeastern portion of the District. It would be situated to allow Kings River flood water to be diverted into the District. There is still some open and untilled ground in the Cross Creek area. Opportunities may exist as a result of mitigation for lining canals in other areas of the KDWCD.

2) INSTITUTIONAL PROGRAMS

Similar to a program discussed for Lakeside Water ID, a program will be initiated that will identify farmers that are willing to allow their property to be flooded during the months of January to March when flood water is available in exchange for payment.

3) FACILITATING CONJUNCTIVE USE

Kaweah Delta Water Conservation District - Importation of CVP Water

This past year there was an opportunity to purchase water from the CVP that was being carried into the winter season. Through agreements with Tulare ID, Lakeside Water ID, KDWCD, and KCWD, these districts were able to share costs for the water and seepage losses so that the project would operate in the fall. Conversations should continue and determine if this could result in an annual operation.

Develop the Cross Creek Recharge Basin project and the Kaweah River flood water agreement to help with groundwater replenishment along Cross Creek.

Tulare Lake Basin Water Storage District

Negotiate with the Tulare Lake Basin Water Storage District to allow an exchange of State interruptible water for Kings River water.

City of Hanford

Meet with the City to gain approval to utilize their storm drainage basins for intentional recharge activities where possible. The goal would be to establish criteria and design parameters to be used by the City when constructing basins.

Corcoran I.D.

Discussion should be initiated with the CID on the potential utilization of the Lakelands Canal to be utilized for intentional recharge activities when it is not in use and flood water is available.

APPENDIX E

WATER PURCHASE POTENTIAL/ASSESSMENT/ASSUMPTION PROGRAM

- 1) Evaluate the effectiveness and cost of the share assumption program.

Continue the purchase of mutual ditch company stock within the District for preservation of the existing surface water rights.

Continue the Share Assessment Agreement with stockholders of the mutual ditch companies to insure acquisition of the existing water stock within the District.

- 2) Review potential of purchase of other supplies.

Kings River

Implement the Kings River Flood Water Agreement through the Peoples Ditch Company and the Last Chance Water Ditch Company.

Review the potential of acquiring additional Kings River supplies

Central Valley Project

Negotiate a Section 215 contract with the U.S. Bureau of Reclamation for the acquisition of surplus San Joaquin River water.

Review the potential to acquire additional water from the Kings River, CVP, Kaweah River, Tule River, Kern River, Cross Valley Water.